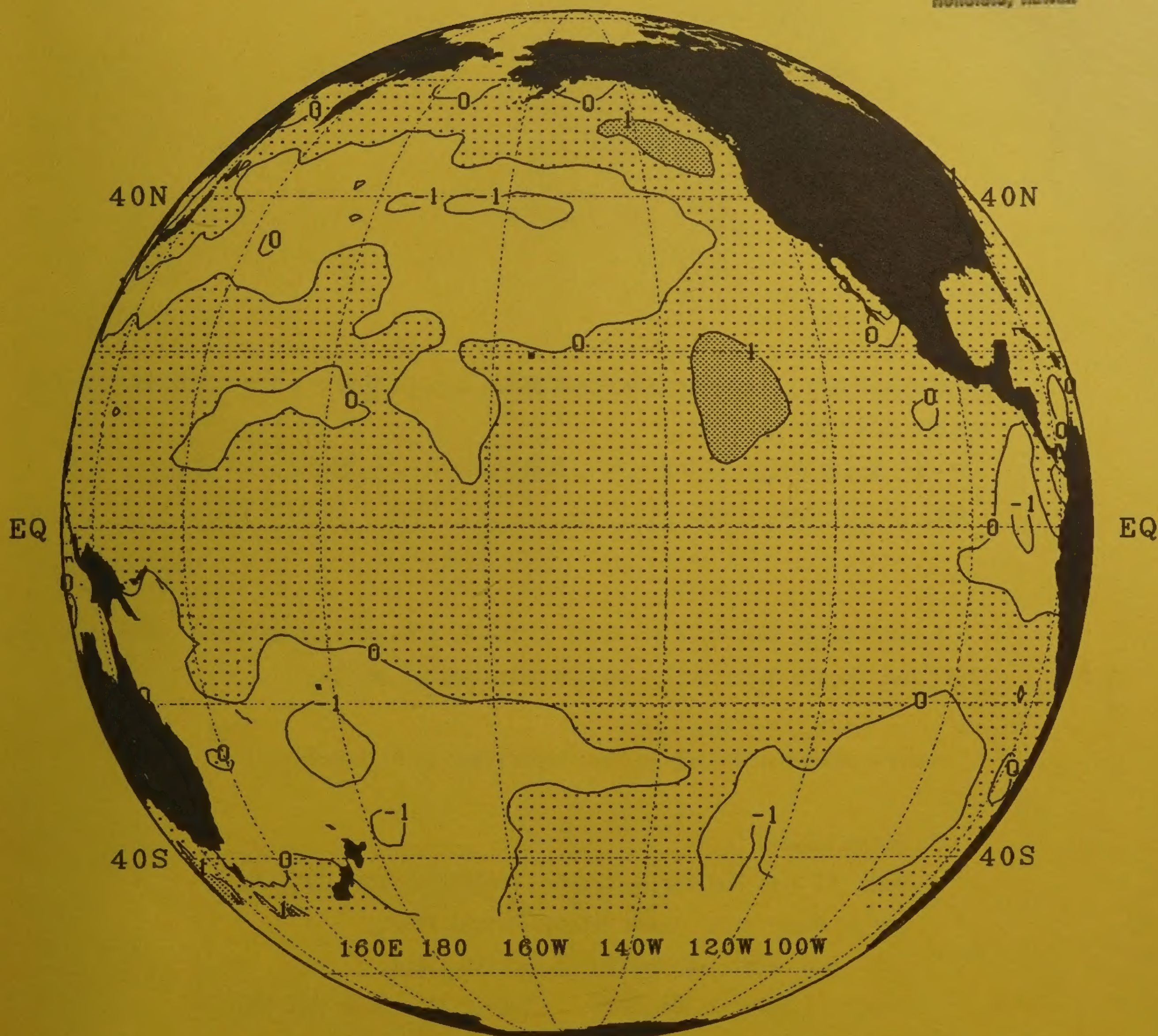
気 象 庁 海 洋 月 報

Monthly Ocean Report

May 1994 (No. 17)



El Niño Monitoring Center
Japan Meteorological Agency

気 象 庁 海 洋 気 象 部 海 洋 課
エ ル ニ ー ニ ョ 監 視 セ ン タ ー

平 成 6 年 5 月

気象庁海洋月報は、気象庁海洋気象部海洋課エルニーニョ監視センターで作成されています。
本月報に関する問い合わせは、

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Monthly Ocean Report is prepared by the El Niño Monitoring Center, Oceanographical Division, Marine Department, Japan Meteorological Agency.

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表紙は1994年５月の太平洋の月平均海面水温偏差図です。
陰影部は平年より高温の海域を示しています。

The figure on the front cover shows the monthly mean SST anomalies for May 1994 in the Pacific Ocean.
Areas of positive anomalies are shaded.

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海況の特徴（１９９４年５月）

太平洋の海況

太平洋赤道域の海面水温は、ペルーの沖合で平年より１℃以上低かったほかは、全般に平年より高く、170°Ｅ付近及び170°Ｗから140°Ｗでは平年より0.5℃以上高かった。エルニーニョ監視海域（4°Ｓ～4°Ｎ、150°Ｗ～90°Ｗ）の海面水温偏差は、+0.2℃だった（第１表、第１図、第６図）。

赤道域表層の28℃以上の暖水層は、150°Ｅから160°Ｅにかけて最も厚かった（第３図）。150°Ｅから160°Ｅにかけての28℃以上の暖水層の厚さは、1993年10月以来厚くなる傾向が続いていた（第９図）。

５月下旬に、気象庁の海洋気象観測船「啓風丸」は137°Ｅ線上を日本近海から赤道域にかけて海洋観測を行った。その結果によると、5°Ｎ付近の28℃以上の表層の暖水層の厚さは、1989年以来の同時期の観測の中で最も薄かった昨年同期とほぼ同じであった。一方、13°Ｎ付近の暖水層の厚さは1989年以来の同時期の観測の中で最も厚く、100m深まで達した（図Ａ）。

北太平洋の海面水温は、40°Ｎ帯に沿って150°Ｅから130°Ｗにかけて平年より低く、特に、170°Ｅから150°Ｗにかけて平年より1℃以上低かった。カリフォルニア半島沖及びアラスカ湾沖では平年より１℃以上高い状態が続いていた（第１図）。

日本近海の海況

日本近海の海面水温は、沖縄東方で平年より1℃以上低く、九州西方及び日本海西部でも平年より低かった。一方、本州南方から本州東方にかけては平年より1℃以上高かった。（第17図）。

黒潮は九州の南東で蛇行し、室戸岬に接岸して流れた後、紀伊半島沖から東に流れ、中旬には三宅島付近を、下旬には三宅島の南を通って房総半島沖を東に流れていた（第20図）。

本州東方の親潮系の冷水（深さ100mで５℃以下）は37.5°Ｎ・143.1°Ｅまで達していた（第19図）。

熱帯の気象

太平洋の赤道域では、中部太平洋の下層で西風偏差に転じた。対流活動は、130°Ｅから160°Ｅにかけて平年より活発だった。海面気圧分布では、インド洋から西部太平洋にかけて正偏差、太平洋中部から東部にかけて負偏差が広がり、南方振動指数（ＳＯＩ）は-1.4と３カ月続けて大きな負の値となった（第１表、第12図、第13図）。

［気象庁長期予報課提供］

HIGHLIGHTS May 1994

Pacific

Sea surface temperatures (SSTs) in the equatorial Pacific were above normal except off Peru where SSTs were more than 1°C below normal. SSTs were more than 0.5°C above normal near 170°E and between 170°W and 140°W along the equator. The SST index for region B (Fig. 6) was +0.2°C (Table 1 and Figs. 1, 6).

Surface warm water (above 28°C) along the equator was thickest between 150°E and 160°E (Fig. 3). The thickness there has continued to increase since October 1993 (Fig. 9).

According to the oceanographic observation by R/V Keifu Maru of the JMA from 32°N to 3°N along the meridian of 137°E, surface warm water (above 28°C) around 5°N was as thin as in May 1993, when it was thinnest among observations since 1989. However, surface warm water (above 28°C) around 13°N was about 100m in depth and thickest among the observations (Fig. A).

In the North Pacific, SSTs were more than 1°C below normal along 40°N from 170°E to 150°W. SSTs off Baja California and off the Gulf of Alaska continued to be more than 1°C above normal (Fig. 1).

Seas adjacent to Japan

SSTs in the seas adjacent to Japan were more than 1°C below normal east of Okinawa and below normal west of Kyushu and the western part of the Japan Sea. SSTs were more than 1°C above normal south of Honshu and east of Honshu (Fig. 17).

The Kuroshio meandered southeast of Kyushu, and flowed toward the Muroto-misaki. It flowed eastward from Kii Peninsula, passing near Miyake Island in middle May, south of Miyake Island in late May, and on to the Boso Peninsula (Fig. 20).

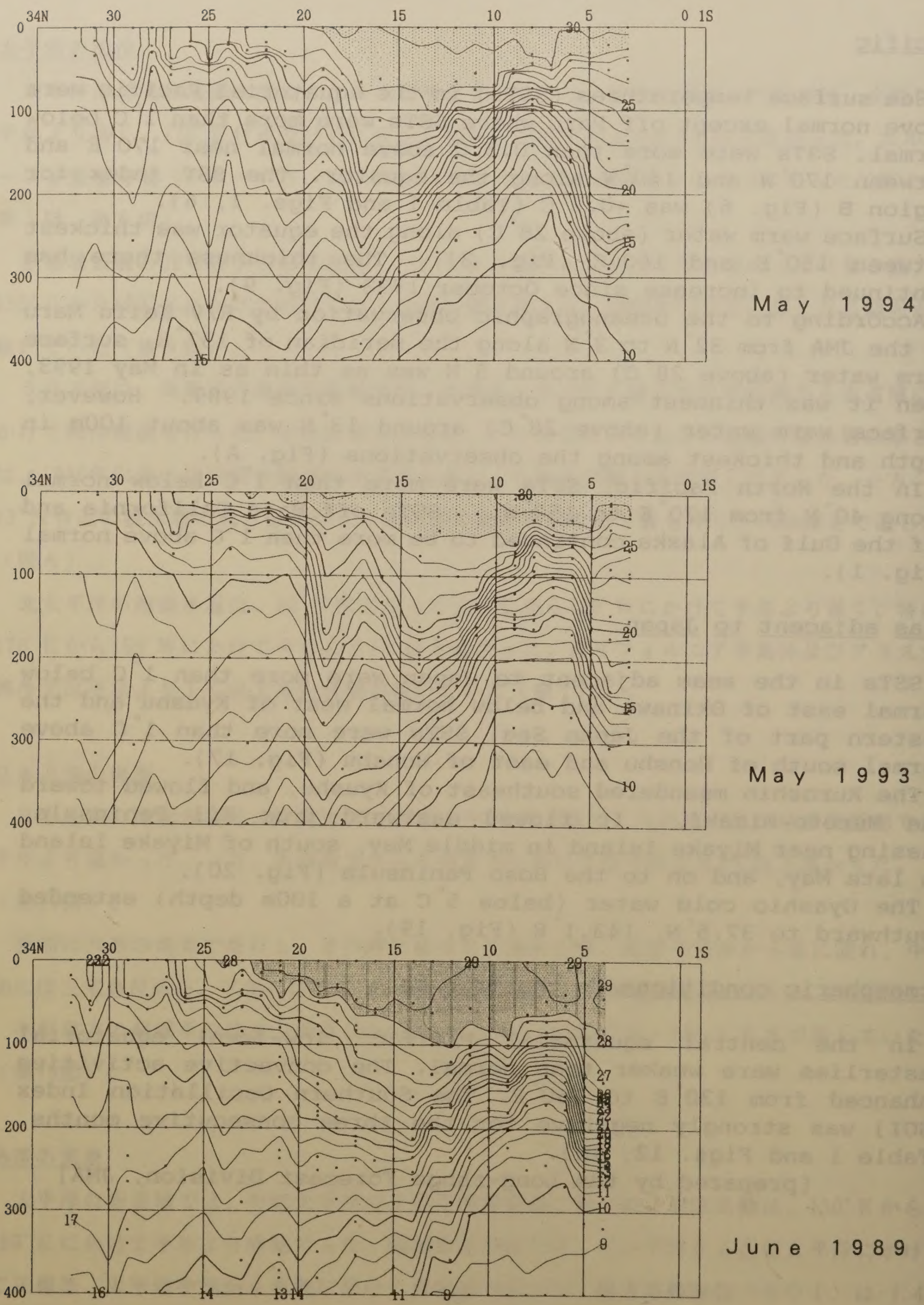
The Oyashio cold water (below 5°C at a 100m depth) extended southward to 37.5°N, 143.1°E (Fig. 19).

Atmospheric conditions in the tropics

In the central equatorial Pacific ,low-level equatorial easterlies were weaker than normal. The convective activities enhanced from 130°E to 160°E. The Southern Oscillation Index (SOI) was strongly negative for the three consecutive months. (Table 1 and Figs. 12, 13).

[prepared by the Long-range Forecast Division, JMA]

Depth-Latitude Section of Temperature along 137°E



図－A　137°Eに沿う表層水温断面図（上：1994年5月、中：1993年5月、下：1989年6月）

Fig. A　Depth-latitude section of ocean temperature along 137°E for May 1994(top), May 1993(middle) and June 1989(bottom). The contour interval is 1°C.

Date		1993												1994					
		DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY
Pacific Sea Surface Temperature (℃)																			
D	(14N~ Eq.)	28.7	28.0	28.0	28.2	28.6	28.8	29.2	29.1	28.9	29.1	29.1	29.5	29.1	28.4	28.5	28.6	29.1	29.4
	(130E~150E)	-0.2	-0.5	-0.3	-0.2	-0.2	-0.3	-0.1	-0.1	-0.2	-0.1	-0.2	+0.3	+0.2	-0.1	+0.2	+0.2	+0.3	+0.3
A	(4N~ 4S)	28.8	28.5	28.4	28.4	28.7	29.0	29.1	29.1	28.8	29.1	28.8	28.9	28.7	28.2	28.0	28.2	28.4	28.9
	(160E~150W)	+0.6	+0.5	+0.4	+0.3	+0.5	+0.5	+0.6	+0.6	+0.4	+0.8	+0.4	+0.5	+0.5	+0.2	0.0	+0.1	+0.2	+0.4
B	(4N~ 4S)	25.0	25.5	26.6	27.4	28.1	28.0	27.0	25.8	24.9	24.8	25.0	25.2	25.3	25.7	26.1	26.9	27.0	26.8
	(150W~ 90W)	+0.1	+0.1	+0.4	+0.5	+1.0	+1.4	+0.9	+0.6	+0.3	+0.2	+0.4	+0.6	+0.4	+0.3	-0.1	0.0	-0.1	+0.2
C	(Eq. ~ 10S)	22.5	24.3	26.1	27.0	26.4	25.2	23.3	22.1	21.0	20.8	21.3	21.5	22.8	24.7	26.0	25.3	24.2	23.4
	(90W~ 80W)	-0.1	0.0	+0.4	+1.1	+1.3	+1.3	+0.6	+0.5	+0.4	+0.5	+0.6	0.0	+0.2	+0.4	+0.3	-0.6	-0.9	-0.5
Pacific Sea Level Anomaly (cm)																			
YAP	(10N, 138E)	8	7	9	11	1	-2	-2	1	-1	5	8	8	10	7	7	6	2	
RABAUL	(4S, 152E)	-6	-9	-10	-14	-12	-13	-11	-8	-9	-7	-6	-5	-2	-1	3	4	5	
MAJURO	(7N, 171E)	4	-1	-4	-4	-8	-1	6	5	3	1	5	2	3	2	2	3	5	
TARAWA	(1N, 173E)	4	1	7	10	3	5	6	4	7	4	6	2	1	6	-1	6	6	
CHRISTMAS	(2N, 157W)	1	5	4	8	6	5	-1	-2	-1	-1	-2	-1	-7	-3	-7	0	0	
SANTA CRUZ	(1S, 90W)	-2	4	8	7	7	10	4	0	0	1	3	0	0	-1	0	-4	-8	

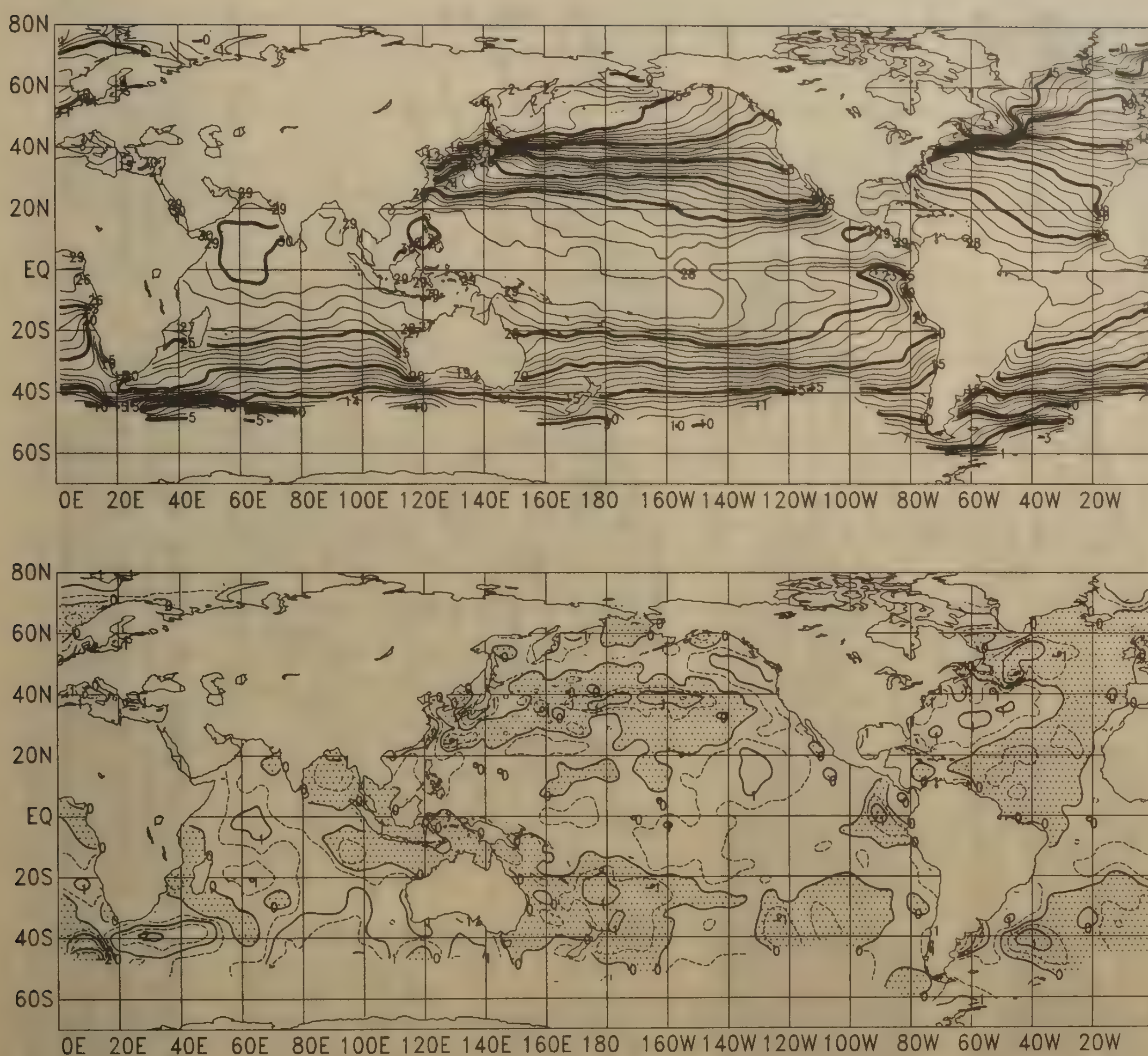
第１表 (a) エルニーニョ監視指数

Table 1(a) El Niño monitoring indices. Data sources are the El Niño Monitoring Center, JMA for the sea surface temperature and the SOC of ISLP-PAC, Department of Oceanography, University of Hawaii for the sea level anomaly.

Date		1993												1994				
		DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY
Southern Oscillation Index																		
SOI	(TAHITI-DARWIN)	-0.5	-0.8	-0.6	-0.5	-1.9	-0.8	-1.6	-1.0	-1.5	-0.7	-1.4	-0.0	0.2	-0.2	0.1	-0.8	-2.1	-1.4
TAHITI	(17.5S, 150W)	-1.1	-1.4	-1.9	1.0	-0.7	0.2	-0.6	-1.1	0.0	-0.0	-0.9	0.1	-0.0	-0.1	0.0	-0.1	-1.5	-0.8
DARWIN	(12.5S, 131E)	-0.2	0.4	-0.3	2.4	1.9	1.4	1.3	0.4	2.2	1.4	1.3	0.1	-0.5	0.3	-0.2	1.7	1.2	1.0
High Cloud Amount Index																		
HCLD-PH	(20N ~ 10N) (110E ~ 140E)	-1.4	-1.0	-0.3	-0.4	-0.5	-2.2	-1.9	-0.5	-0.4	0.7	-0.1	-0.6	1.2	-0.5	-0.5	0.6	0.7	0.2
HCLD-MC	(5N ~ 5S) (110E ~ 135E)	0.4	-1.1	-0.9	-1.1	0.3	-1.4	-2.1	-1.0	-1.4	-1.0	-1.5	-0.8	-0.2	-0.4	-0.5	0.8	0.4	0.4
HCLD-DL	(5N ~ 5S) (170E ~ 170W)	1.2	0.8	1.4	0.5	2.8	2.0	1.8	1.3	0.3	1.8	1.7	-0.2	0.0	0.0	-0.7	-0.6	0.4	-0.3
Equatorial Zonal Wind Index																		
U200-IN	(5N ~ 5S) (80E ~ 100E)	0.1	-0.1	0.8	-0.9	-0.3	0.5	0.4	-0.3	-0.5	-2.1	-0.7	-0.8	-1.8	-0.4	-0.8	-1.5	-0.2	-0.3
U200-CP	(5N ~ 5S) (180 ~ 125W)	0.7	-0.3	-0.3	0.0	-0.6	-1.3	-0.0	1.1	0.3	-0.3	0.0	-0.5	0.4	0.4	0.8	0.2	-0.3	-0.5
U850-WP	(5N ~ 5S) (160E ~ 175W)	0.8	0.3	0.9	0.3	0.8	0.5	0.3	0.1	0.7	-0.0	0.9	-0.4	-0.7	-1.2	-1.0	-0.6	-0.5	-0.3
U850-CP	(5N ~ 5S) (170W ~ 135W)	0.2	0.2	0.0	-0.1	0.3	0.6	0.6	-0.8	0.1	0.2	0.4	0.3	-0.5	-0.6	-0.9	-0.2	-0.4	0.2
U850-EP	(5N ~ 5S) (130W ~ 100W)	-0.0	0.1	-0.1	0.2	0.5	0.9	0.7	-0.4	0.8	1.0	0.2	0.9	0.2	0.1	-0.4	0.1	-0.5	0.0

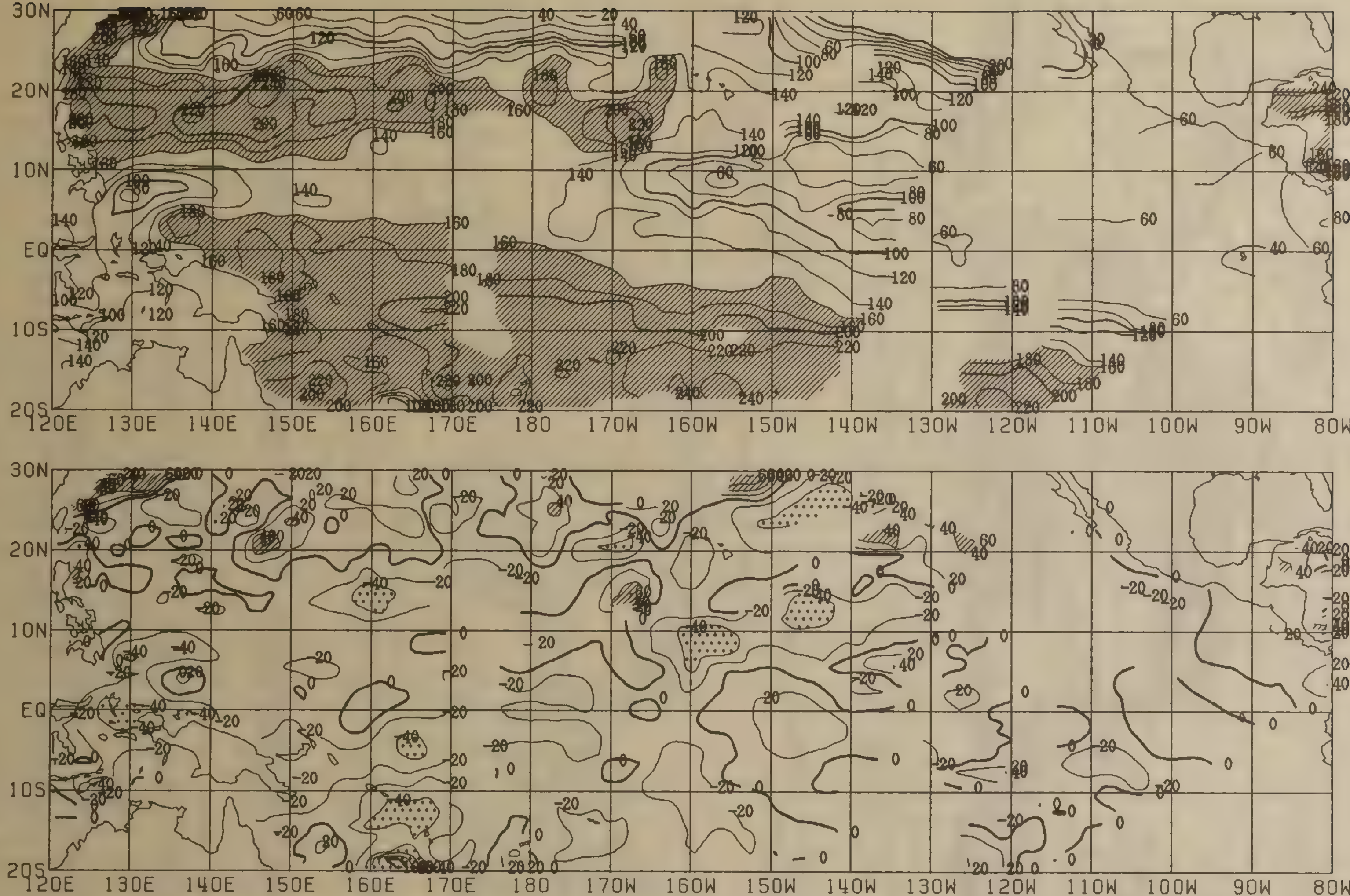
第1表 (b) エルニーニョ監視指数(続き)

Table 1(b) El Niño monitoring indices (continued).
Data source for these atmospheric conditions is the Long-range Forecast Division, JMA.

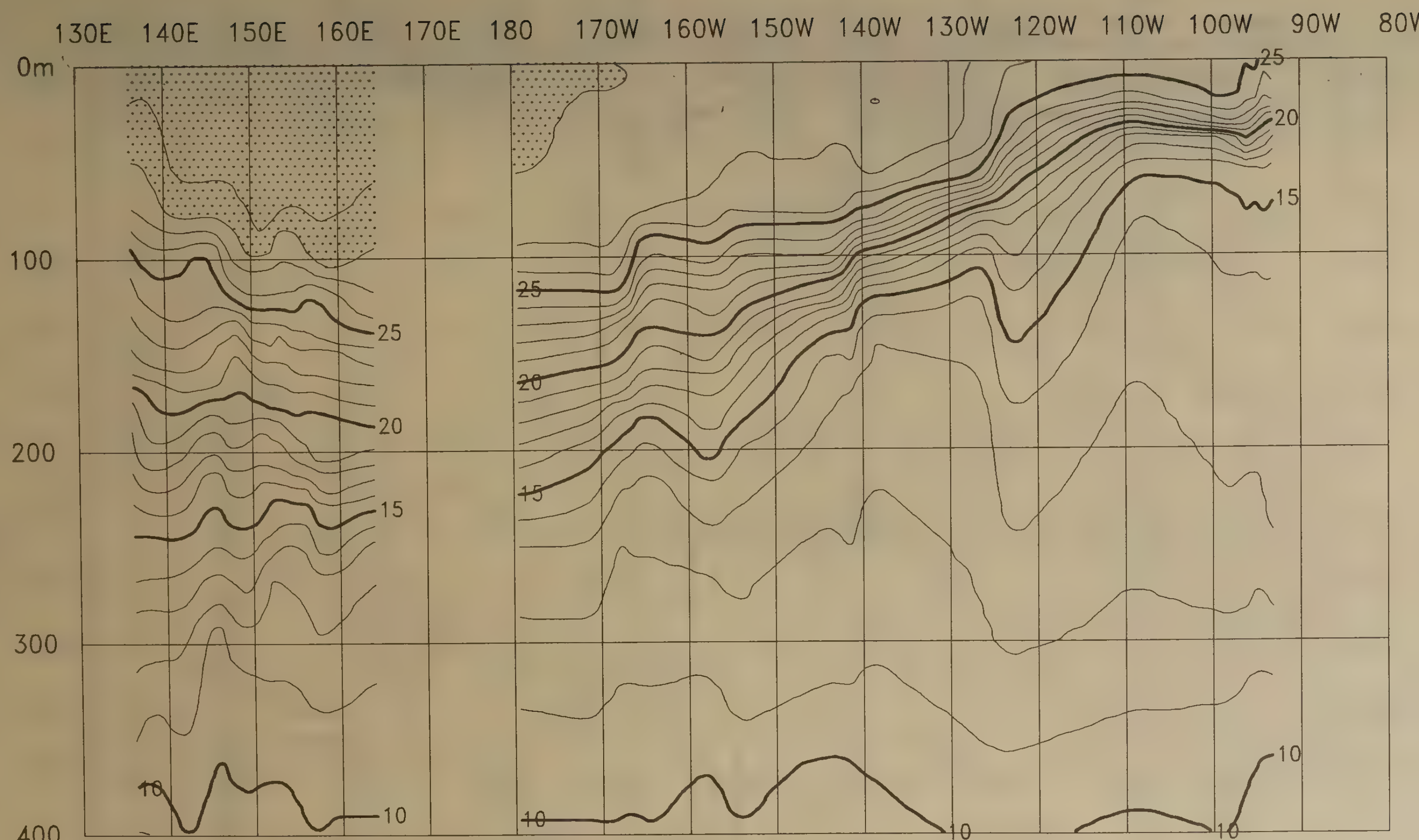


第1図　全球月平均海面水温図（上）及び偏差図（下）（1994年 5月）

Fig.1 Monthly mean sea surface temperature in the global ocean (top) and anomalies (bottom) for MAY 1994. Anomalies are computed with respect to the JMA climatology (1961–90) (Climatic charts of sea surface temperatures of the western North Pacific and the global ocean, March 1991). The Contour interval is 1° C and additional anomaly contours of ±0.5° C are shown as broken lines. Negative anomalies are stippled.

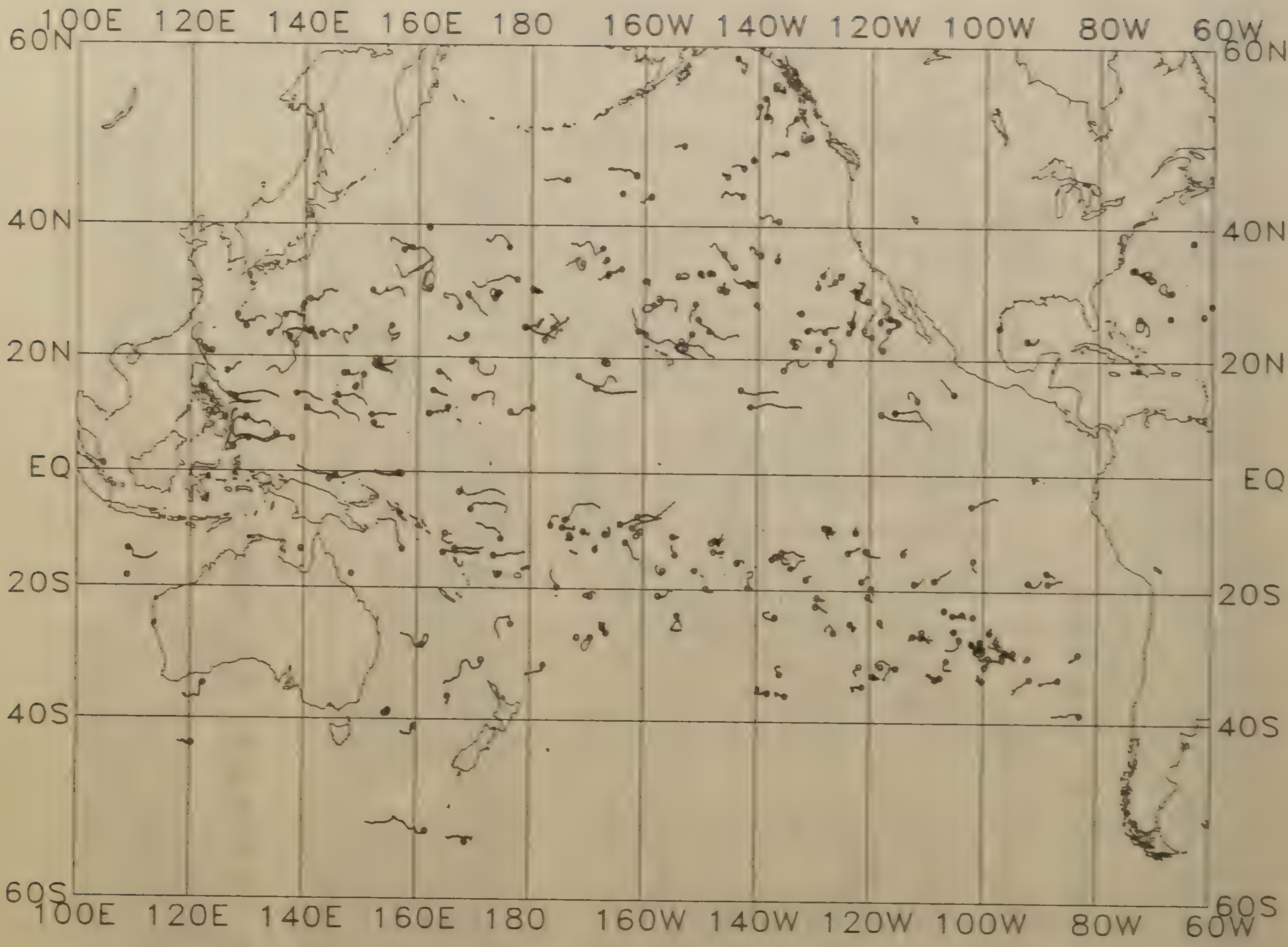


第２図　太平洋表層水温（20℃深度）図（上）及び偏差図（下）（1994年 5月）
Fig.2 The depth of a 20° C isotherm in the Pacific Ocean (top) and anomalies (bottom) for MAY 1994. Anomalies are computed with respect to the climatology (Levitus, 1982, Climatological Atlas of the World Ocean, NOAA).
The contour interval is 20m with shading for values greater than 160m (top), and shading/stippling for values greater/smaller than +40m/−40m (bottom).



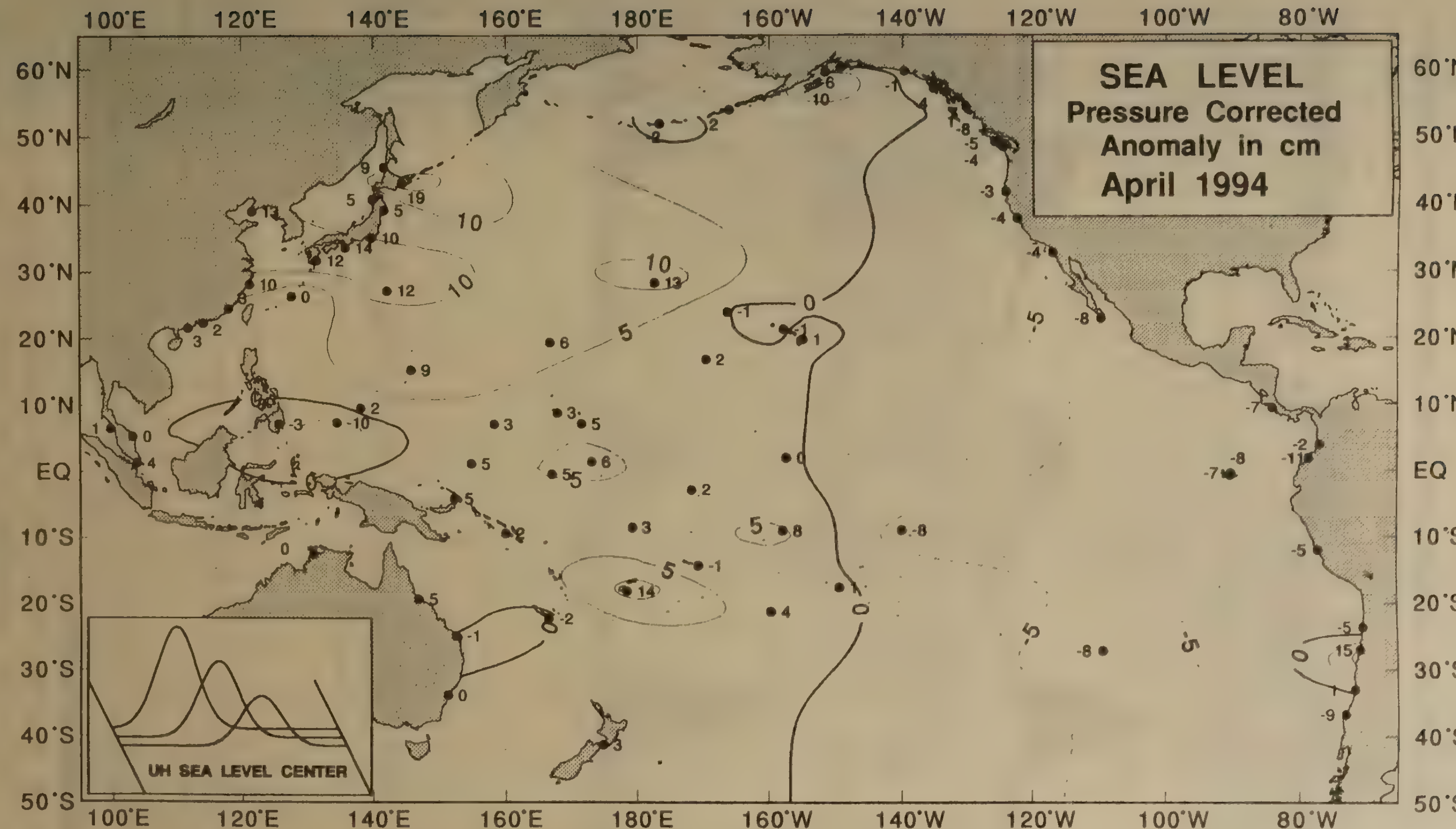
第３図　太平洋赤道に沿う表層水温断面図（1994年 5月）

Fig.3 Depth–longitude section of the Pacific Ocean temperature along the equator for MAY 1994. The contour interval is 1° C with spotted shading for values greater than 28° C.



第4図　太平洋ブイ流跡図(1994年 5月)

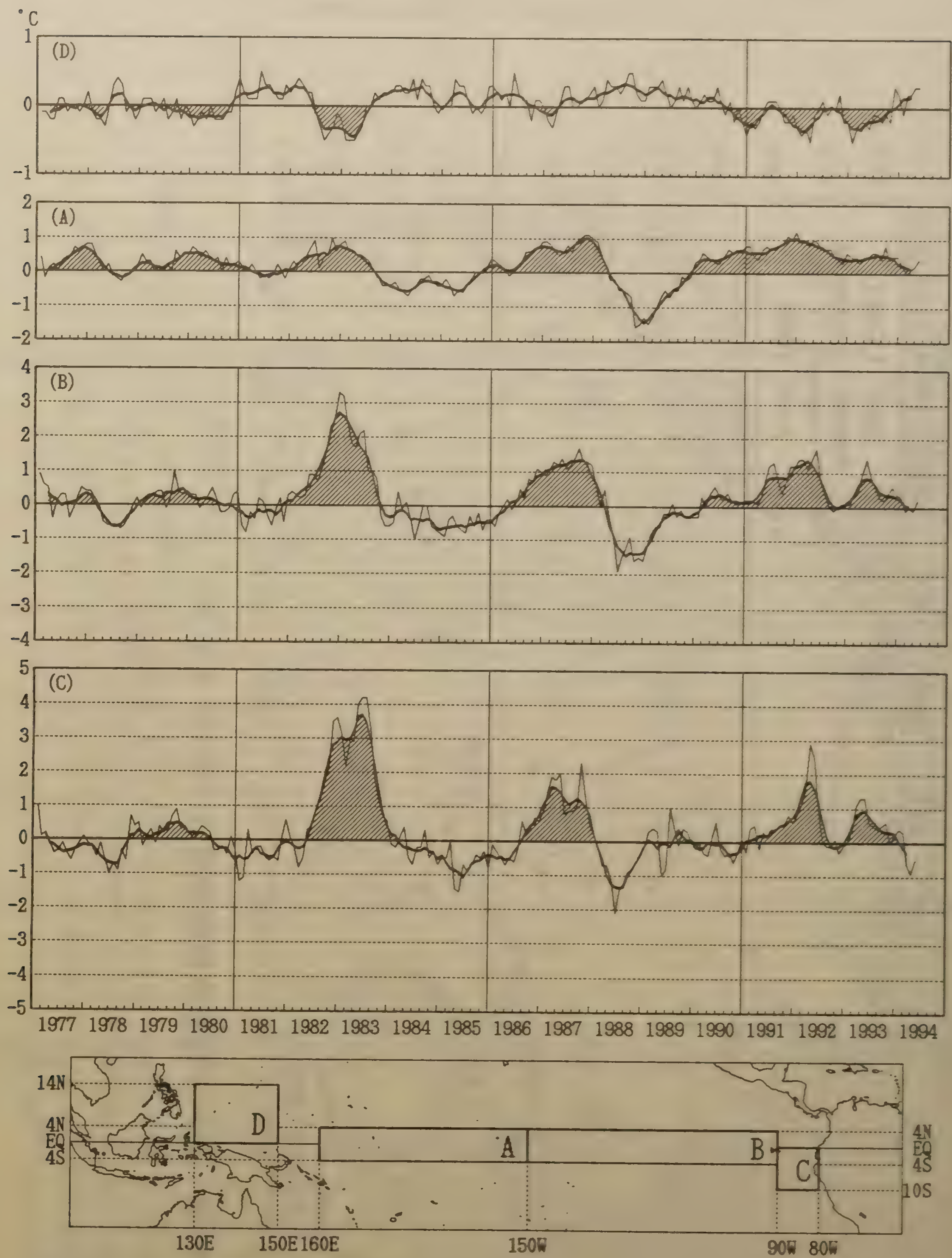
Fig.4　Movements of drifting buoys in the Pacific Ocean during MAY 1994. Each track is one buoy, with the small circle representing the buoy's last position for the month.



第5図　太平洋海面水位偏差図（ 1994年 4月 ）

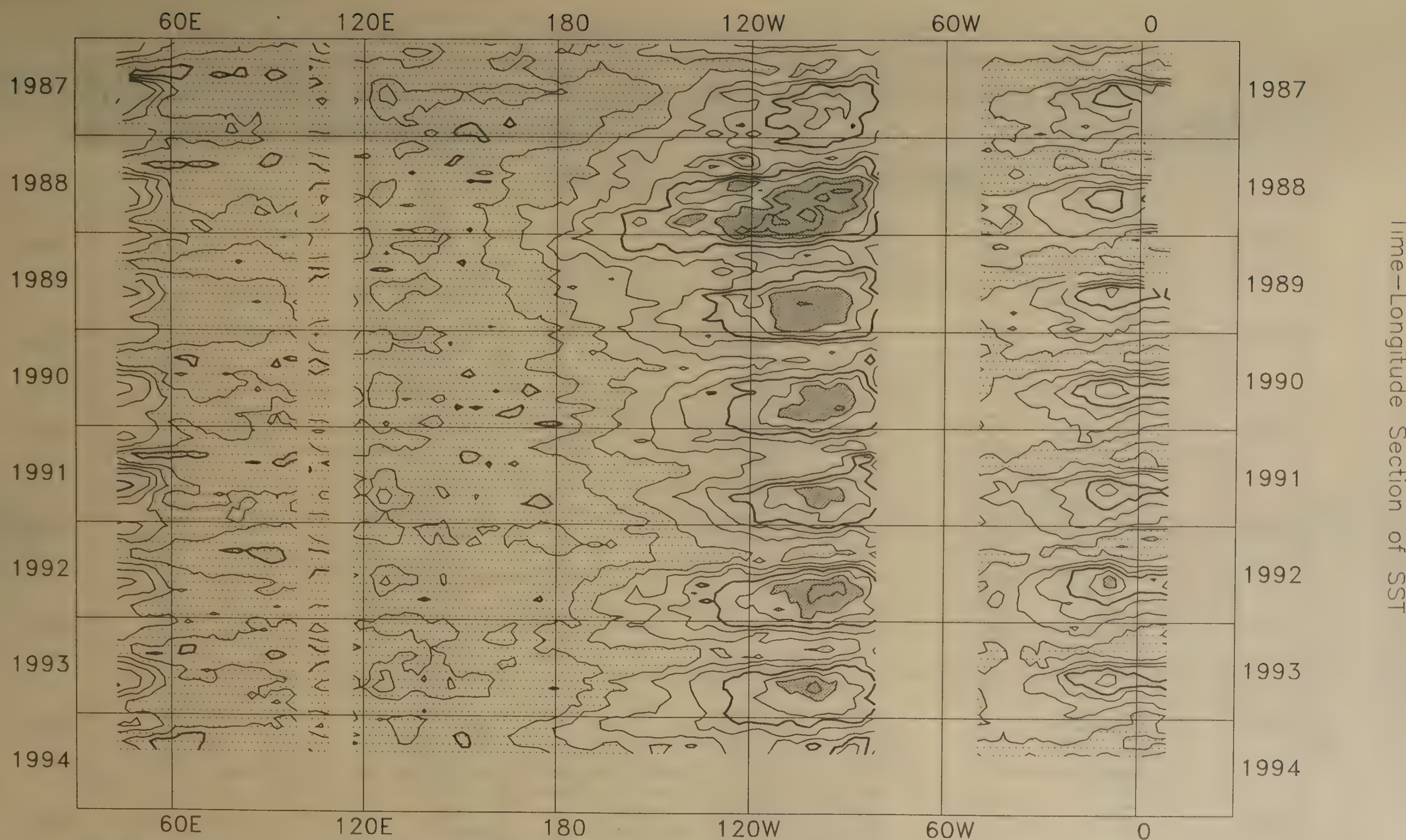
Fig.5　Sea level anomalies obtained from the 1975 to 1986 mean APR sea level adjusted for atmospheric pressure (APR 1994).
This figure is prepared by the SOC of ISLP–PAC, Dept. of Oceanography, Univ. of Hawaii.

Time Series of Equatorial Pacific SST Anomalies



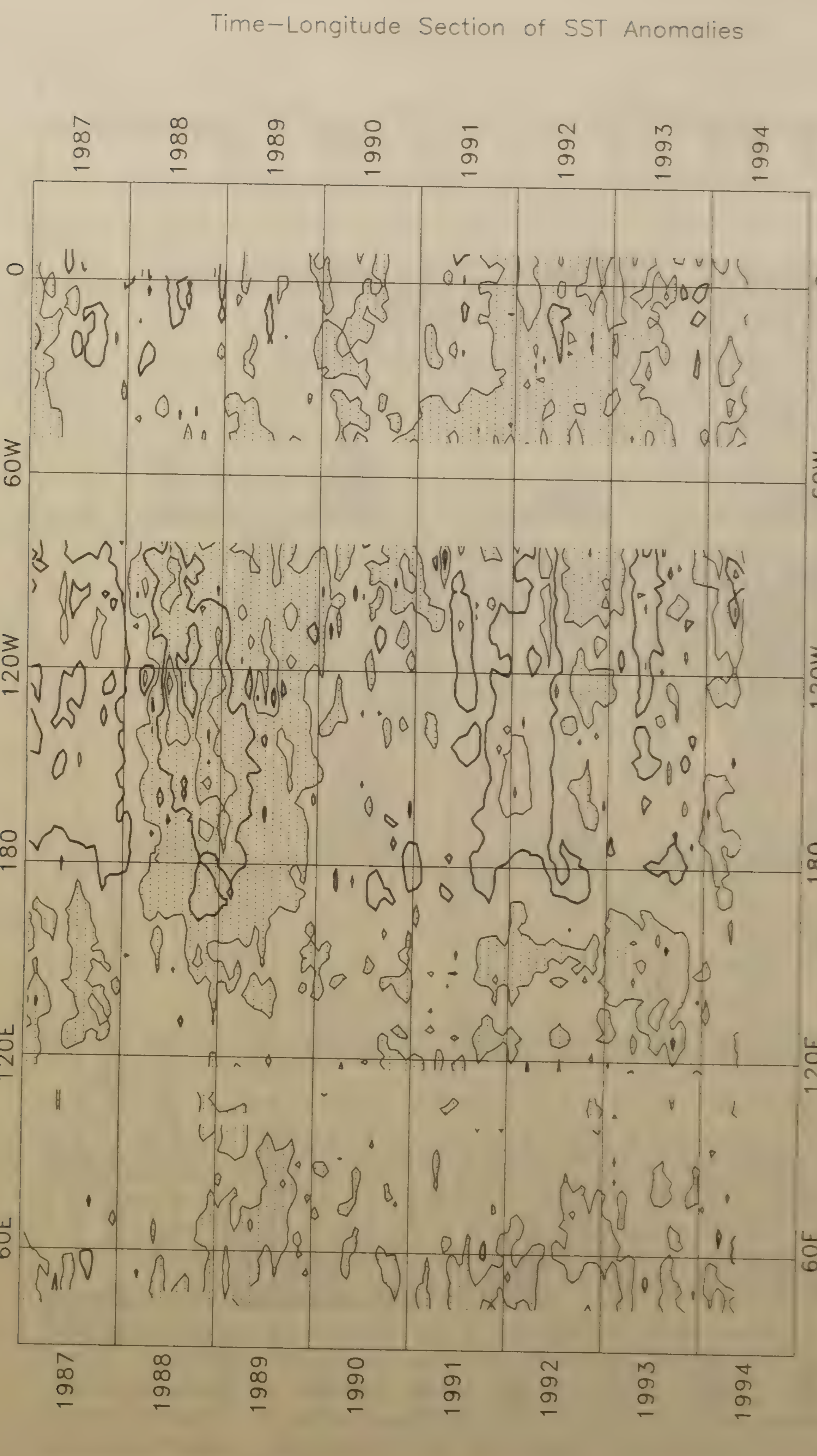
第６図　赤道太平洋海面水温偏差時系列図

Fig.6 Time series of monthly mean SST anomalies in the equotorial Pacific Ocean for the areas indicated at the bottom of the figure. Thin lines show the monthly values and thick lines their 5 month running mean. Positve anomalies (A,B,C) and negative anomalies (D) are shaded. Anomalies are computed with respect to the JMA climatology (1961−90).



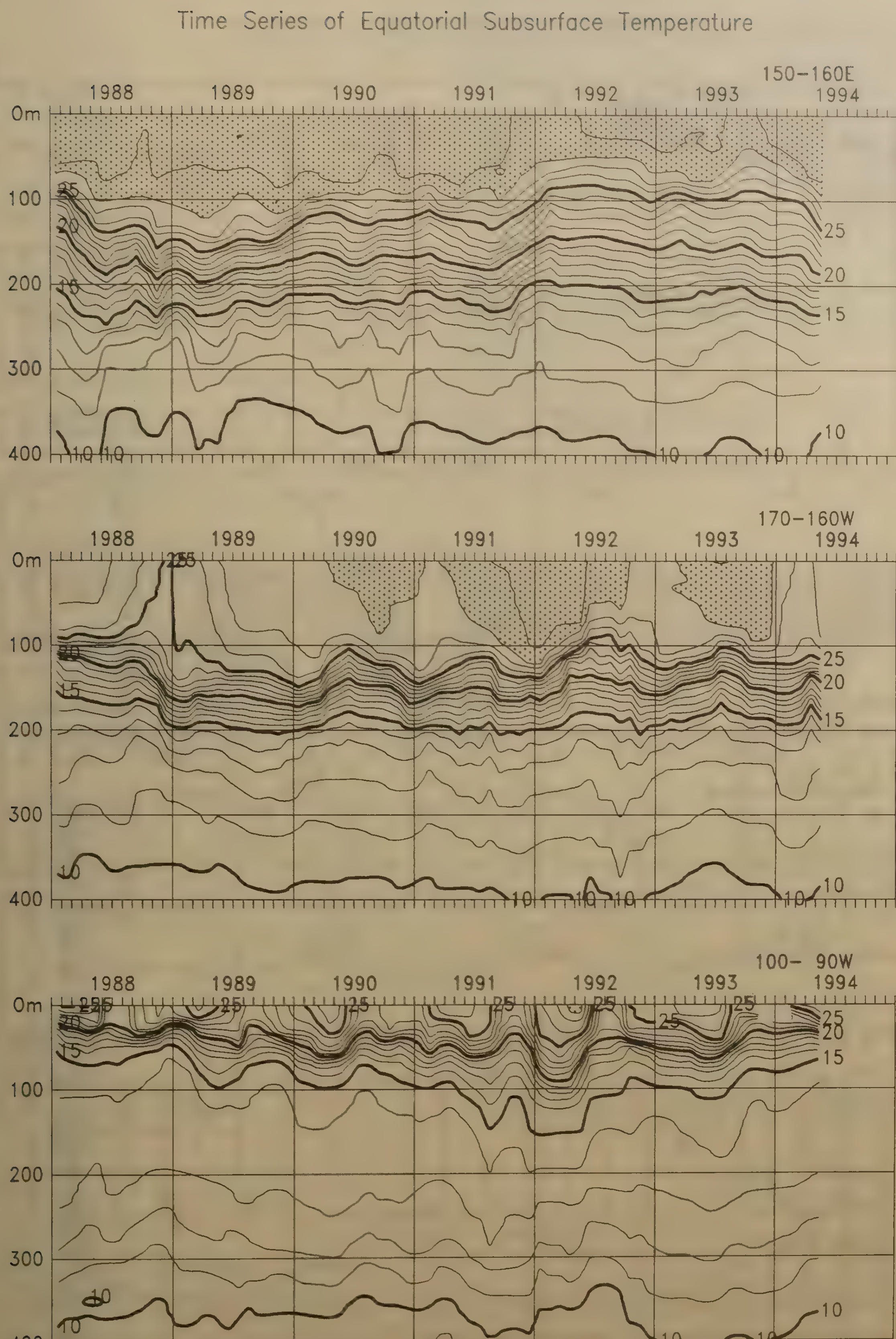
第7図　赤道に沿う海面水温時系列図

Fig.7 Time–longitude section of SSTs along the equator (2° N–2° S) in the global ocean. The contour interval is 1° C, with thick contour lines at 25 and 30° C. SST values greater than 28° C are spotted and values less than 23° C are shaded.



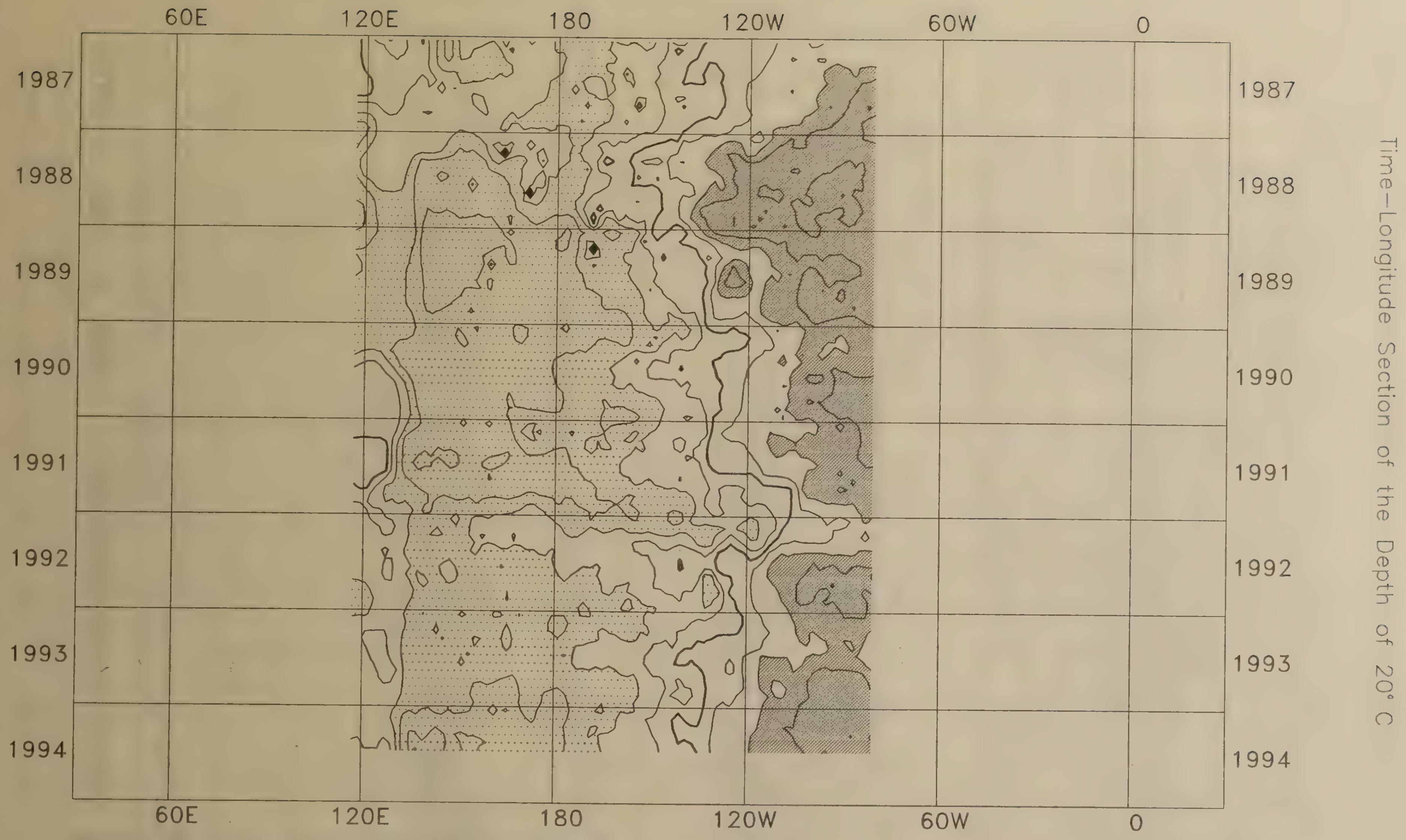
第8図　赤道に沿う海面水温偏差時系列図

Fig.8 Time–longitude section of SST anomalies along the equator (2° N–2° S) based on the JMA climatology (1961–1990). The contour interval is 1° C, with thick contour lines at +1° C and –1° C. Negative anomalies are spotted.



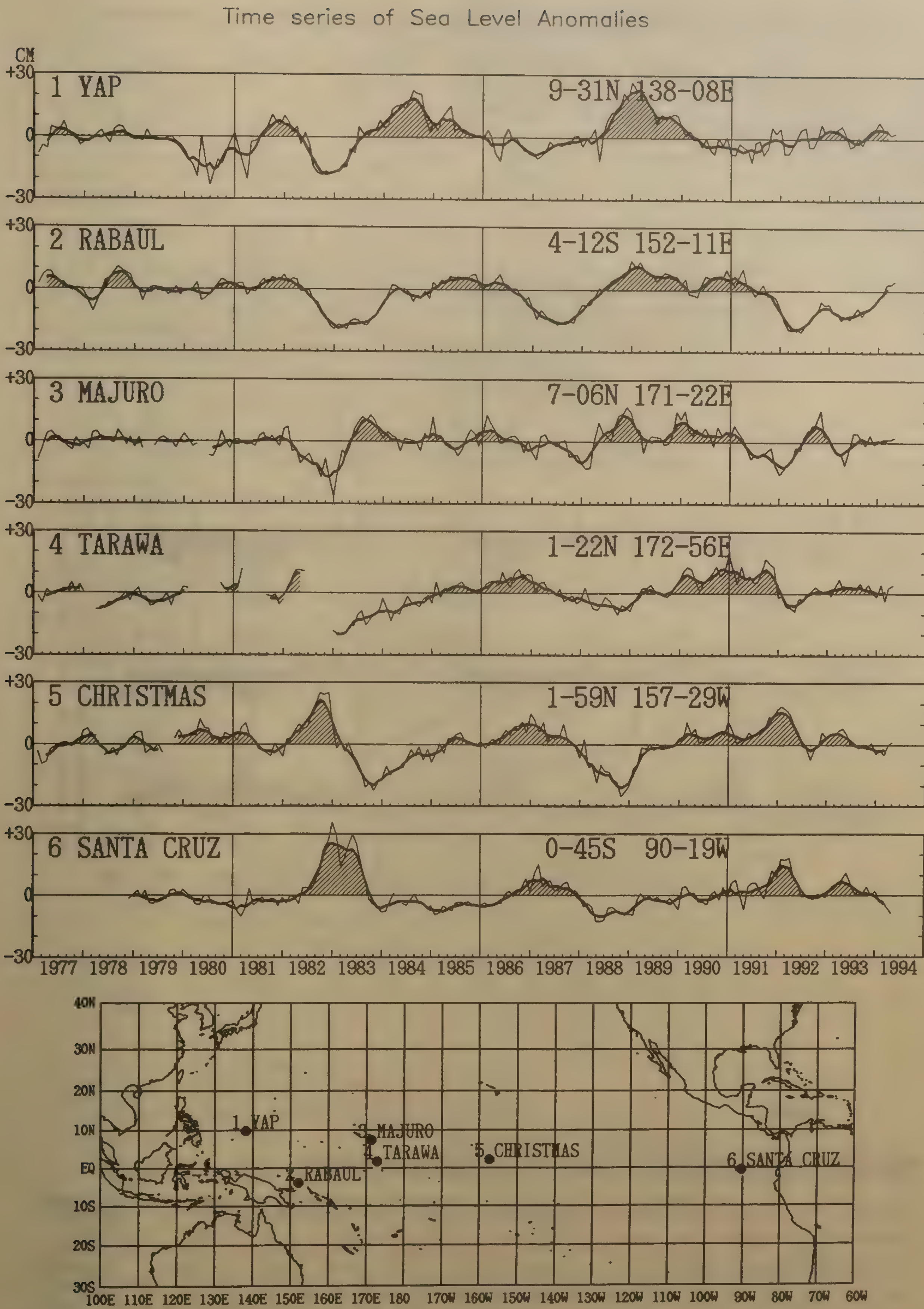
第９図　赤道太平洋表層水温時系列図（上：西部、中：中部、下：東部）

Fig.9 Time series of equatorial (2° N–2° S) subsurface temperature for the western Pacific (top, 150–160° E), the central Pacific (middle, 170–160° W) and the eastern Pacific (bottom, 100–90° W). The contour interval is 1° C with spotted shading for the values greater than 28° C.



第10図　太平洋の赤道に沿う20℃深度時系列図

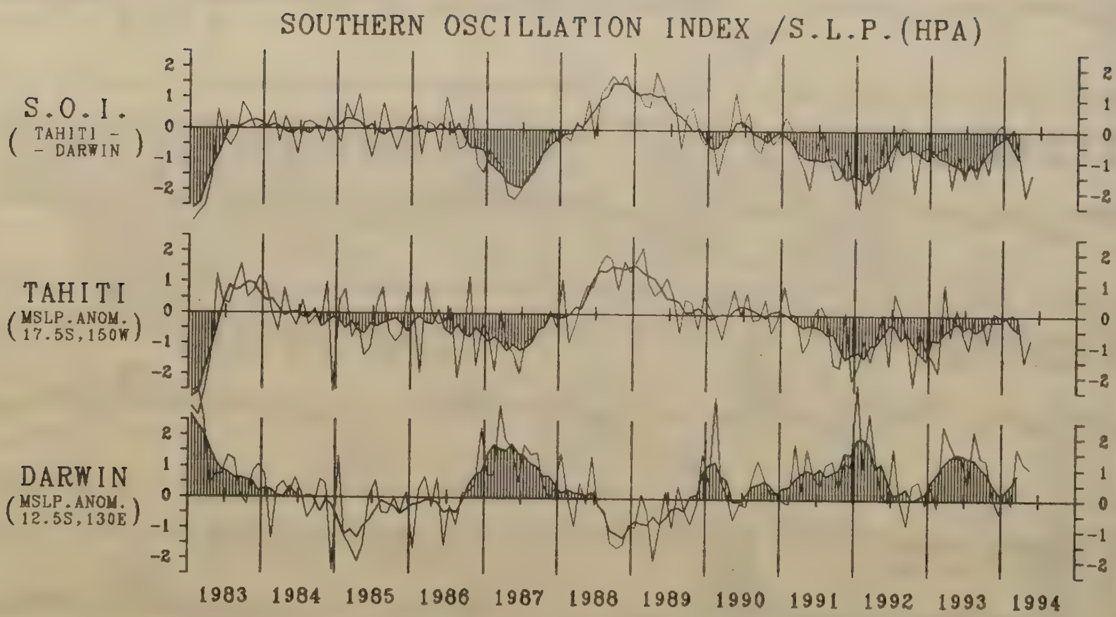
Fig.10 Time–longitude section of the depth of a 20° C isotherm along the equator in the Pacific Ocean. The contour interval is 20m with thick contour lines at 100m. Values shallower than 60m are shaded and those deeper than 140m are stippled.



第11図　太平洋月平均海面水位偏差時系列図

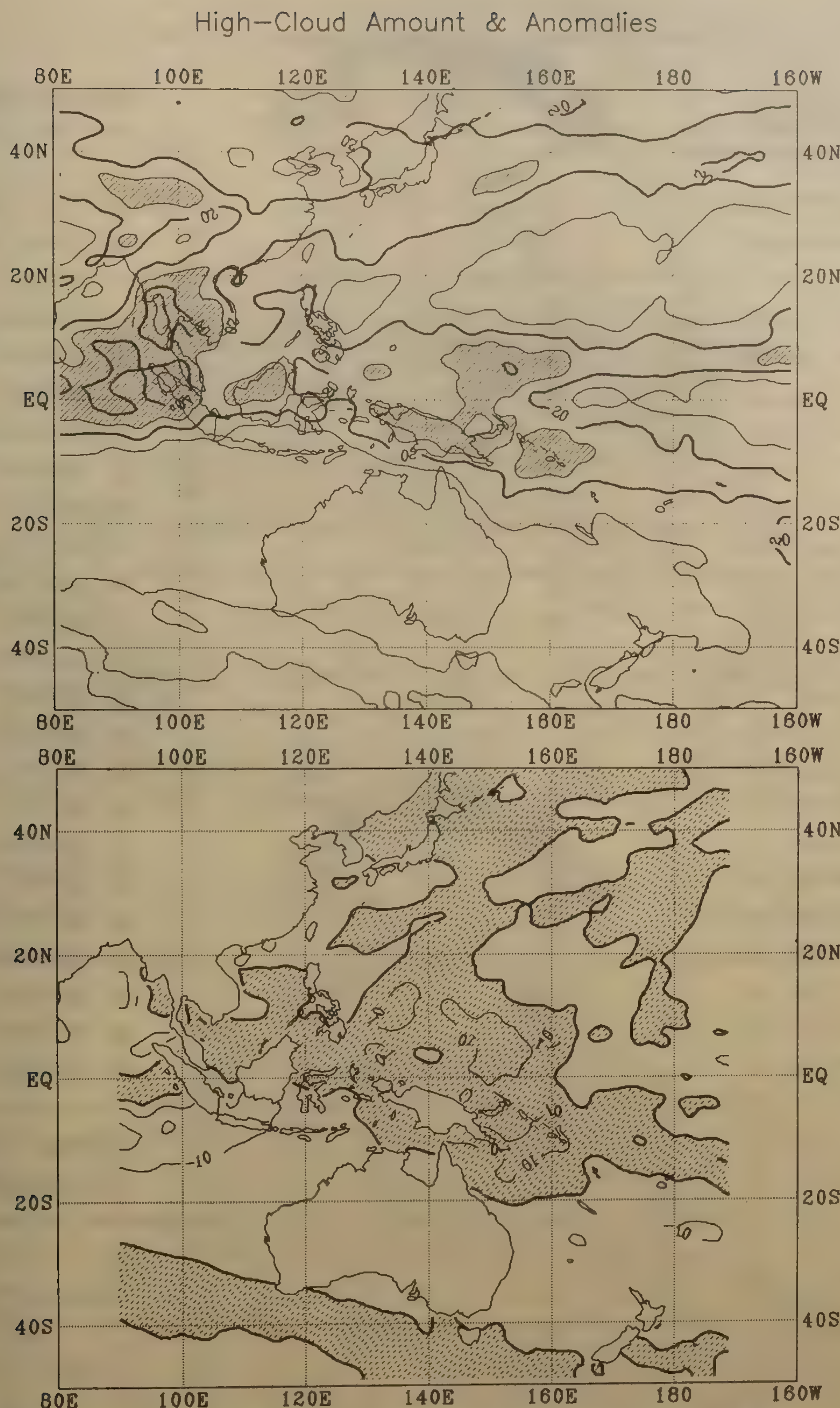
Fig.11 Time series of sea level anomalies based on 1976 to 1990 monthly mean sea level obtained from the stations indicated at the bottom of the figure. Thin lines show the monthly mean and thick lines show their 5 month running mean. Positive anomalies are shaded.

Time series of SOI & Sea Level Pressure Standardized Anomalies



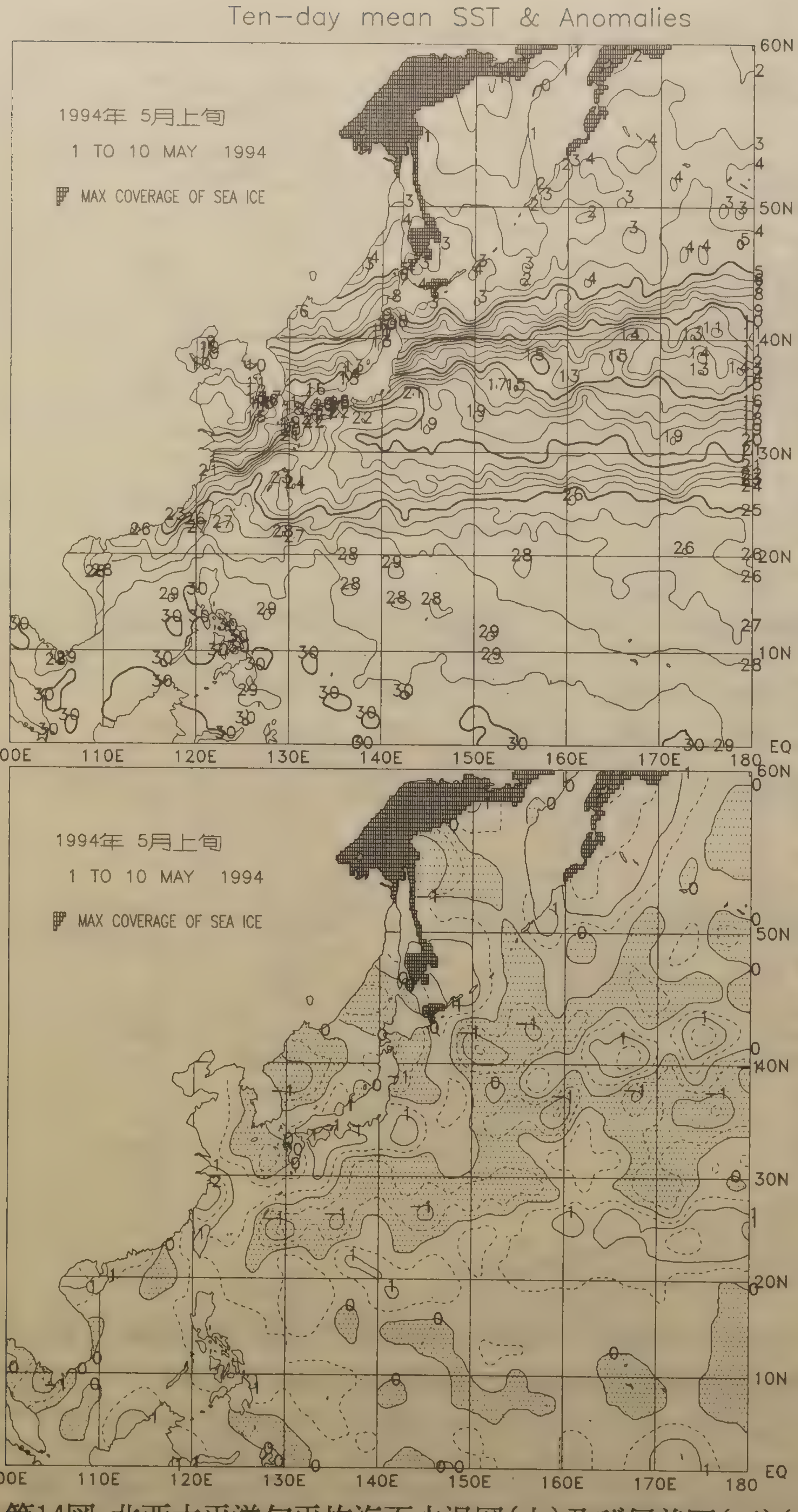
第12図　南方振動指数及び海面気圧偏差時系列図

Fig.12 The Southern Oscillation Index (top) and monthly mean sea level pressure standardized anomalies at Tahiti (middle) and Darwin (bottom). Thin lines show the monthly mean and thick lines their 5 month running mean. Negative values (top, middle) and positive values (bottom) are shaded. Base periods for normals and standard deviations are 1961−1990. This figure is prepared by the Long−range Forecast Division, JMA.



第13図　月平均上層雲量分布図及び偏差図（1994年 5月）

Fig.13 Monthly mean of the high-cloud amount (%, top) and its anomalies (%, bottom) in the equatorial Pacific for MAY 1994. The contour interval is 10%. Areas above 30% are shaded (top) and positive anomalies are stippled (bottom). Anomalies represent a departure from the 1978-1990 base period monthly means. This figure is prepared by the Long-range Forecast Division, JMA.



旬平均沿岸水温(℃)
Coastal Water Temperature

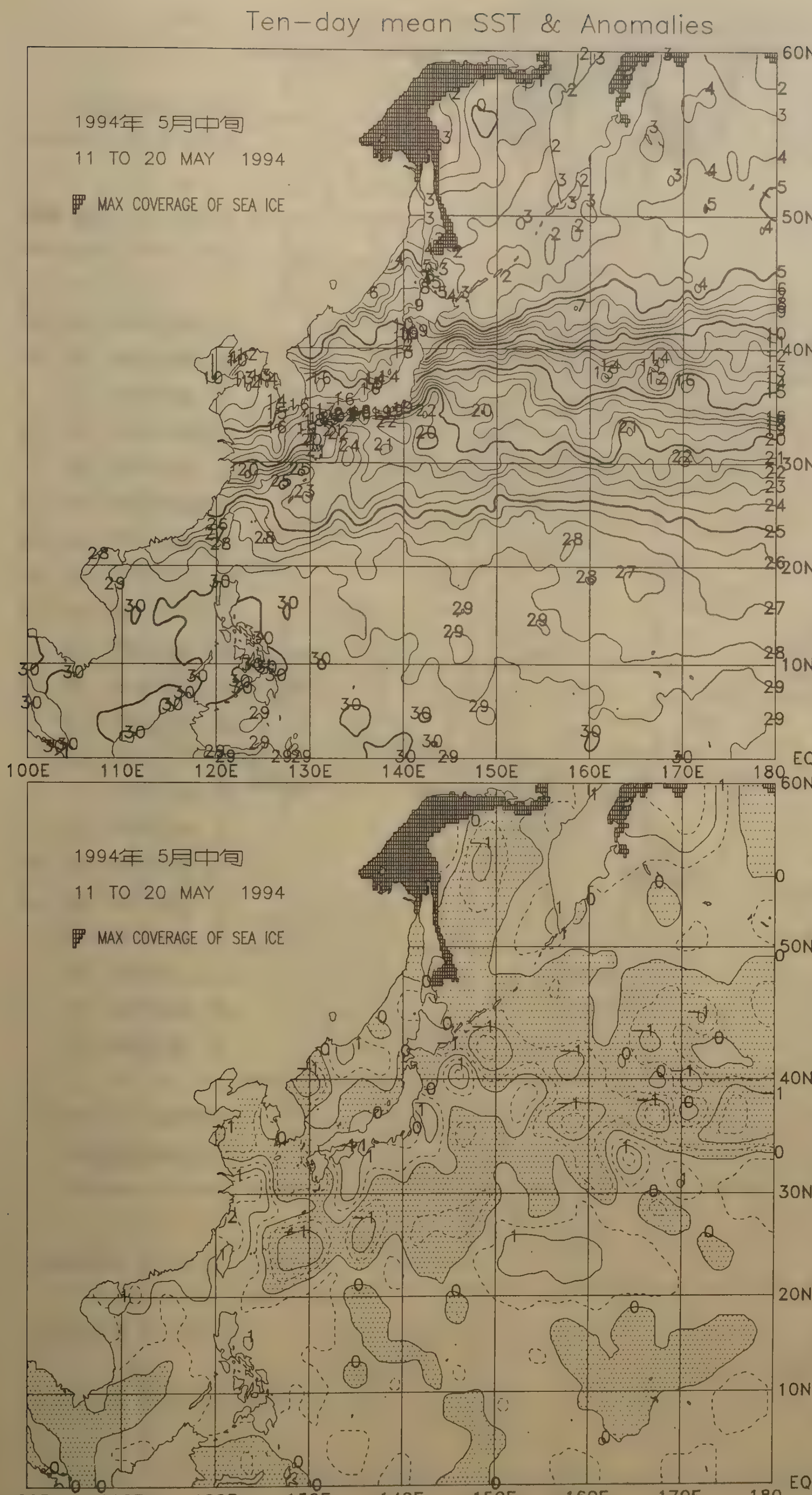
地 名 (Index Number)	水温 Temp.	偏差 Anom.
石垣島(47918)	25.6	0.0
那 覇(47936)	23.4	0.0
名 瀬(47909)	-	-
足摺岬(47898)	20.3	+1.1
潮 岬(47778)	21.4	-
御前崎(47655)	18.1	+0.6
八丈島(47678)	21.3	+1.5
館 山(47672)	17.5	+0.6
小名浜(47598)	13.8	+1.8
宮 古(47585)	8.6	+0.4
浦 河(47426)	-	-
紋 別(47435)	6.5	-
稚 内(47401)	6.8	-
寿 都(47421)	—	-
江 差(47428)	8.4	-
飛 島(47587)	11.9	−0.4
輪 島(47600)	14.9	−0.1
西 郷(47740)	15.1	-
浜 田(47755)	17.1	-
厳 原(47800)	16.1	-
牛 深(47838)	18.7	-

海洋気象ブイロボット
旬平均海面水温(℃)
Ocean Data Buoy SST

日本海	37.9N,134.5E	11.4
四国沖	29.0N,135.0E	21.9
東シナ海	28.2N,126.3E	24.9

第14図 北西太平洋旬平均海面水温図(上)及び偏差図(下)(1994年 5月上旬)

Fig.14 Ten-day mean SSTs in the western North Pacific (top) and anomalies (bottom) for the 1st ten-day period in MAY 1994. Anomalies are computed with respect to the JMA climatology (1961−90). The contour interval is 1°C and additional anomaly contours of 0.5°C are shown. Negative anomalies are stippled.



旬平均沿岸水温(℃)
Coastal Water Temperature

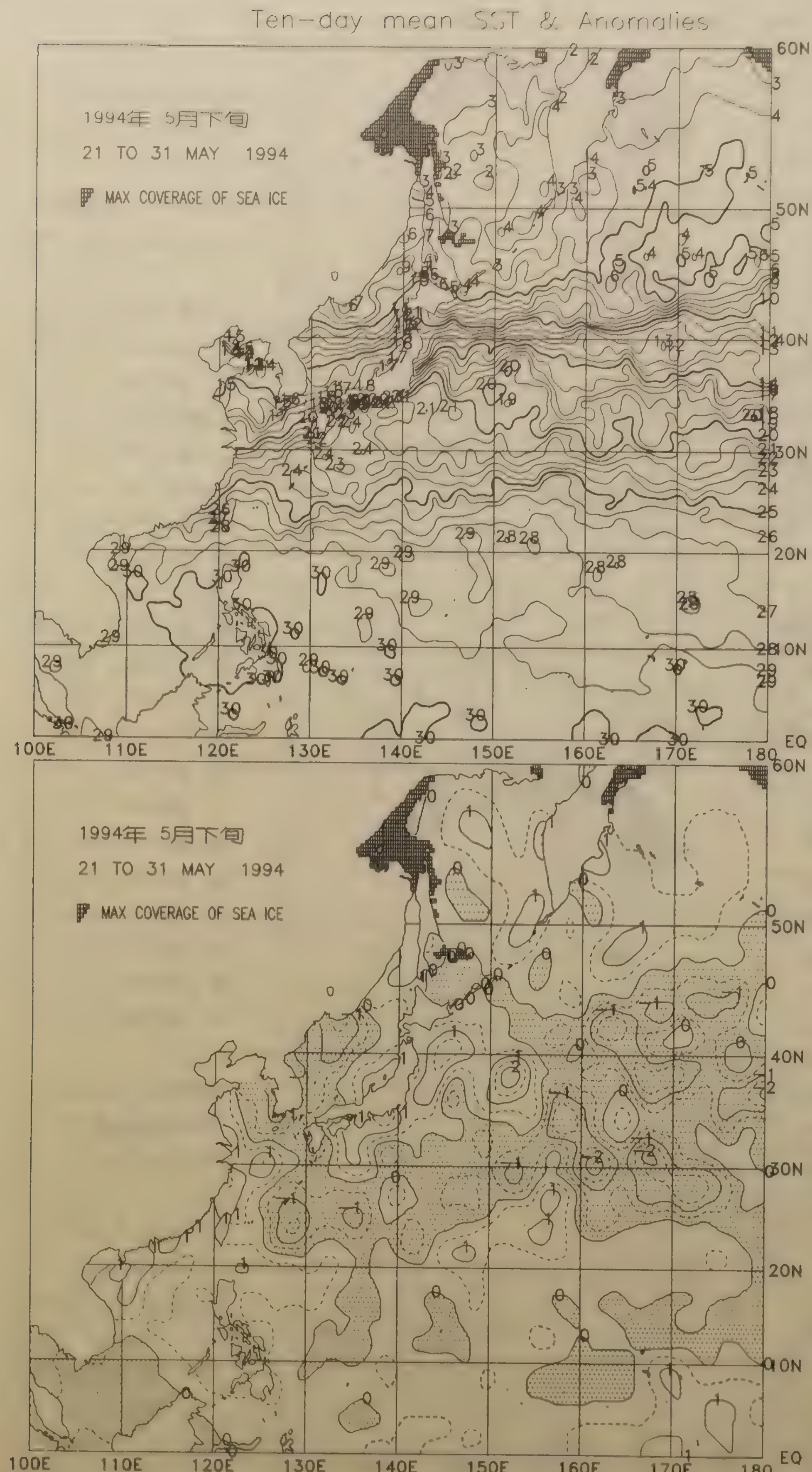
地 名 (Index Number)	水温 Temp.	偏差 Anom
石垣島(47918)	25.9	−0.3
那　覇(47936)	24.0	+0.1
名　瀬(47909)	−	−
足摺岬(47898)	20.9	+0.8
潮　岬(47778)	21.7	−
御前崎(47655)	18.5	−0.1
八丈島(47678)	21.9	+1.2
館　山(47672)	16.8	−1.1
小名浜(47598)	14.1	+1.2
宮　古(47585)	9.8	+0.7
浦　河(47426)	5.1	−0.1
紋　別(47435)	8.2	−
稚　内(47401)	8.8	−
寿　都(47421)	−	−
江　差(47428)	10.9	−
飛　島(47587)	13.2	−0.5
輪　島(47600)	16.8	+0.4
西　郷(47740)	16.0	−
浜　田(47755)	18.0	−
厳　原(47800)	16.7	−
牛　深(47838)	19.4	−

海洋気象ブイロボット
旬平均海面水温(℃)
Ocean Data Buoy SST

日本海	37.9N,134.5E	12.8
四国沖	29.0N,135.0E	22.8
東シナ海	28.2N,126.3E	25.0

第15図 北西太平洋旬平均海面水温図(上)及び偏差図(下)(1994年 5月中旬)

Fig.15 Ten-day mean SSTs in the western North Pacific (top) and anomalies (bottom) for the 2nd ten-day period in MAY 1994. Anomalies are computed with respect to the JMA climatology (1961−90). The contour interval is 1°C and additional anomaly contours of 0.5°C are shown. Negative anomalies are stippled.



旬平均沿岸水温(℃)
Coastal Water Temperature

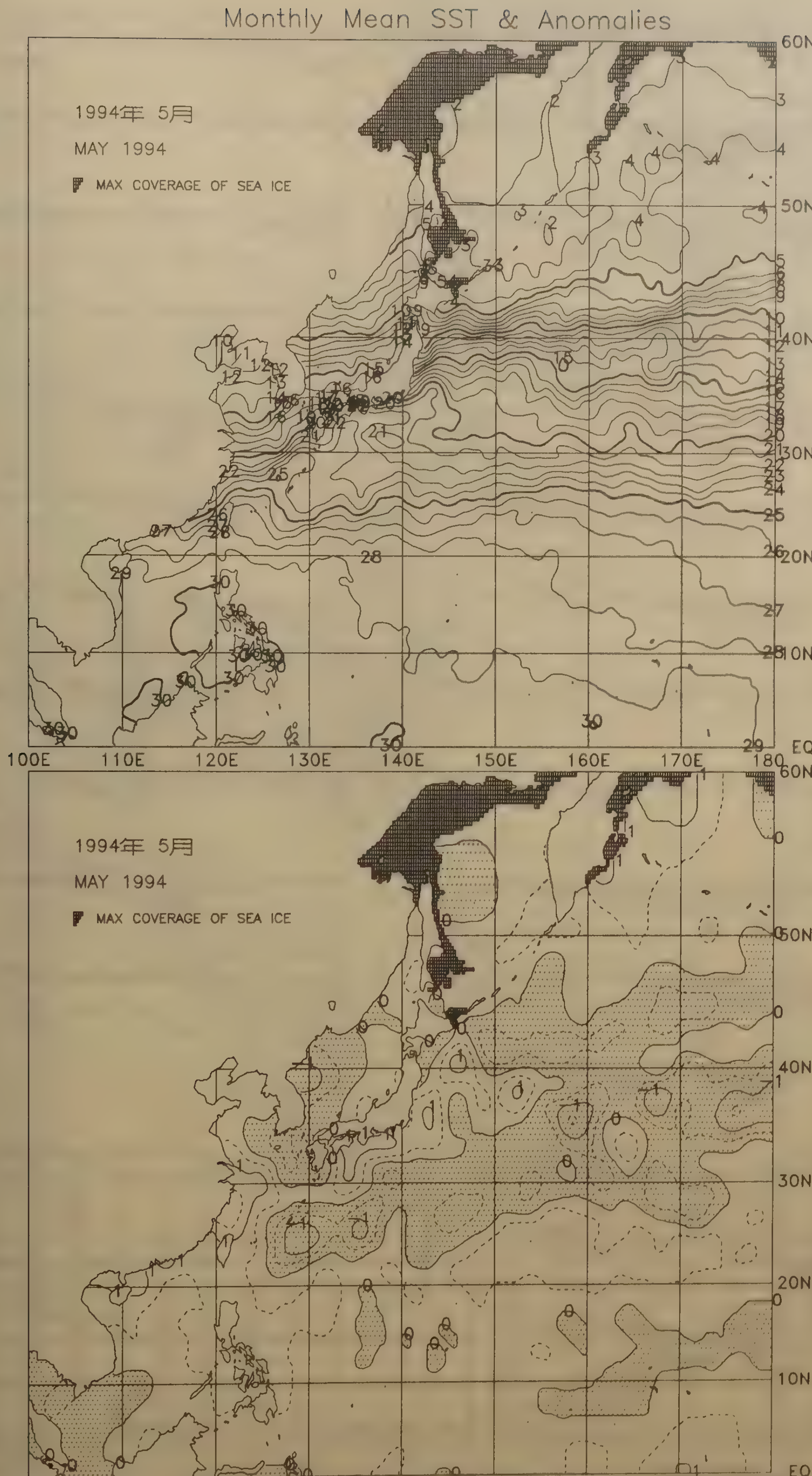
地名 (Index Number)	水温 Temp.	偏差 Anom.
石垣島(47918)	26.4	−0.1
那 覇(47936)	24.5	+0.2
名 瀬(47909)	-	-
足摺岬(47898)	21.8	+0.8
潮 岬(47778)	23.0	-
御前崎(47655)	21.9	+2.3
八丈島(47678)	22.0	+0.9
館 山(47672)	18.0	−0.9
小名浜(47598)	14.9	+1.5
宮 古(47585)	10.9	+0.7
浦 河(47426)	7.9	+1.2
紋 別(47435)	11.3	-
稚 内(47401)	10.9	-
寿 都(47421)	-	-
江 差(47428)	12.4	-
飛 島(47587)	15.6	+0.6
輪 島(47600)	19.1	+1.4
西 郷(47740)	17.4	-
浜 田(47755)	19.2	-
厳 原(47800)	17.4	-
牛 深(47838)	19.6	-

海洋気象ブイロボット
旬平均海面水温(℃)
Ocean Data Buoy SST

日本海	37.9N,134.5E	15.1
四国沖	29.0N,135.0E	23.0
東シナ海	28.2N,126.3E	24.5

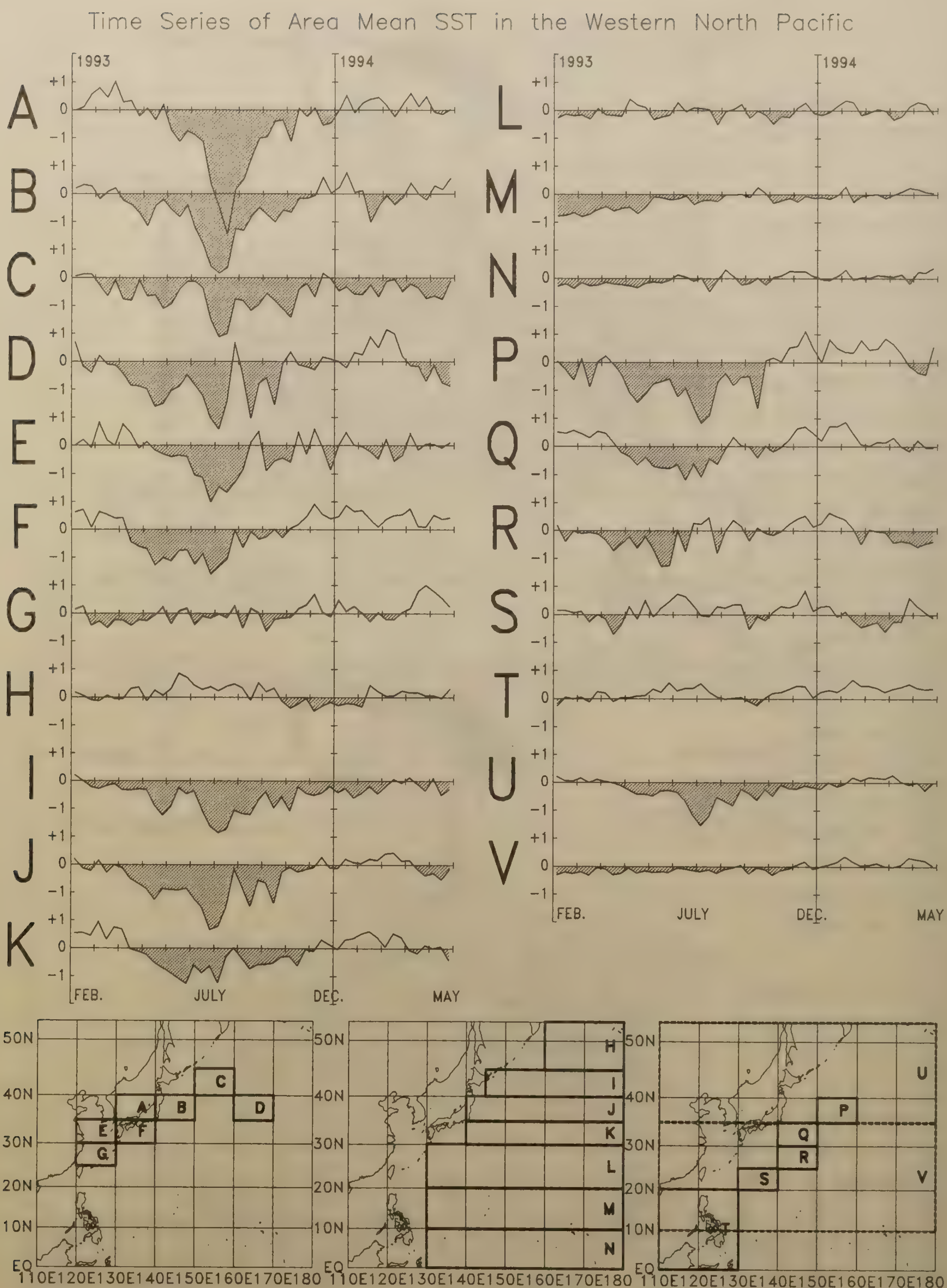
第16図 北西太平洋旬平均海面水温図(上)及び偏差図(下)(1994年 5月下旬)

Fig.16 Ten-day mean SSTs in the western North Pacific (top) and anomalies (bottom) for the 3rd ten-day period in MAY 1994. Anomalies are computed with respect to the JMA climatology (1961–90). The contour interval is 1° C and additional anomaly contours of 0.5° C are shown. Negative anomalies are stippled.



第17図 北西太平洋月平均海面水温図(上)及び偏差図(下)(1994年 5月)

Fig.17 Monthly mean SSTs in the western North Pacific (top) and anomalies (bottom) for MAY 1994. Anomalies are computed with respect to the JMA climatology (1961–90). The contour interval is 1°C and additional anomaly contours of 0.5°C are shown. Negative anomalies are stippled.



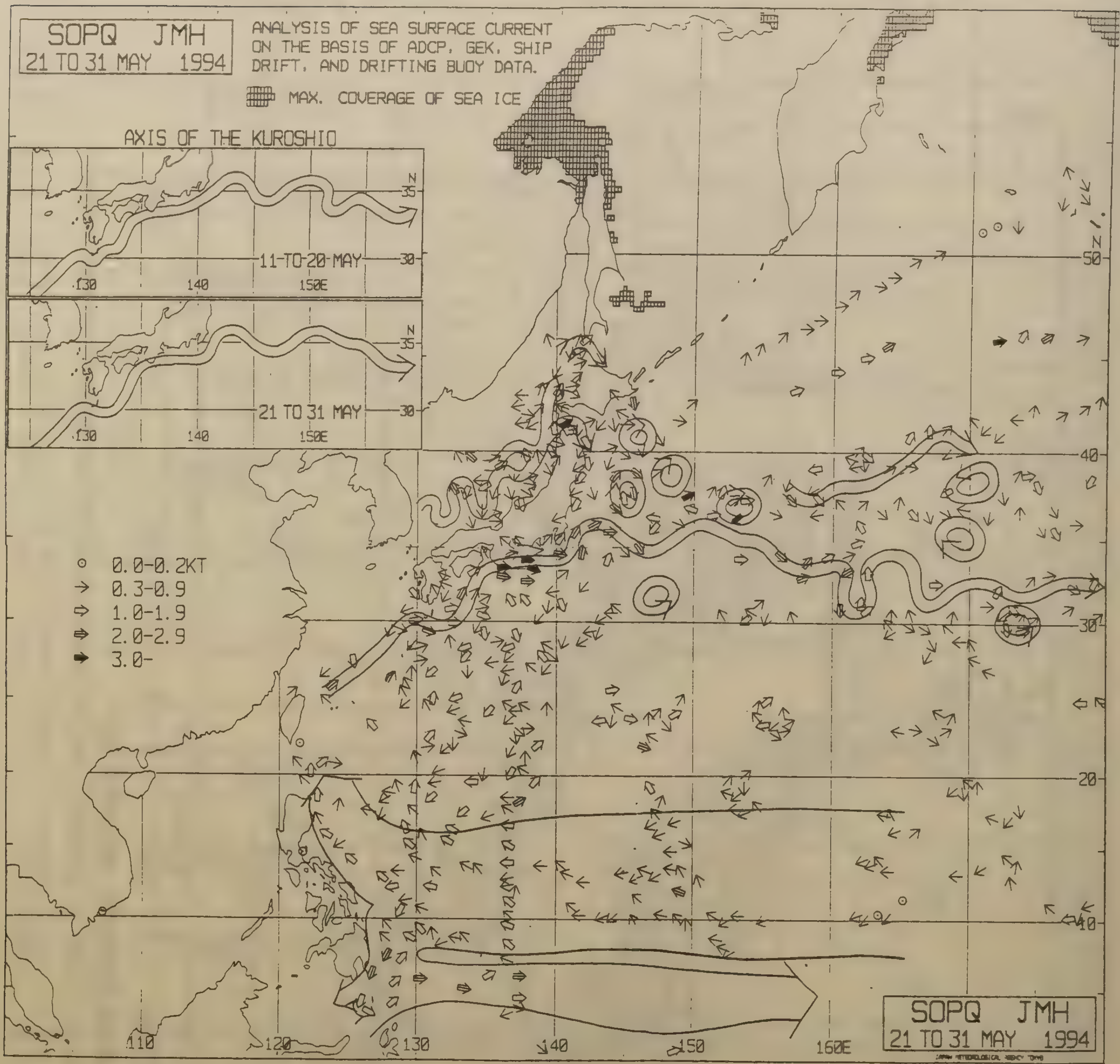
第18図　北西太平洋旬平均海面水温平年偏差時系列図

Fig.18 Time series of the ten-day mean sea surface temperature anomalies (°C) in the western North Pacific for the areas indicated at the bottom. Negative anomalies are shaded. Anomalies are computed with respect to the JMA climatology (1961−90).



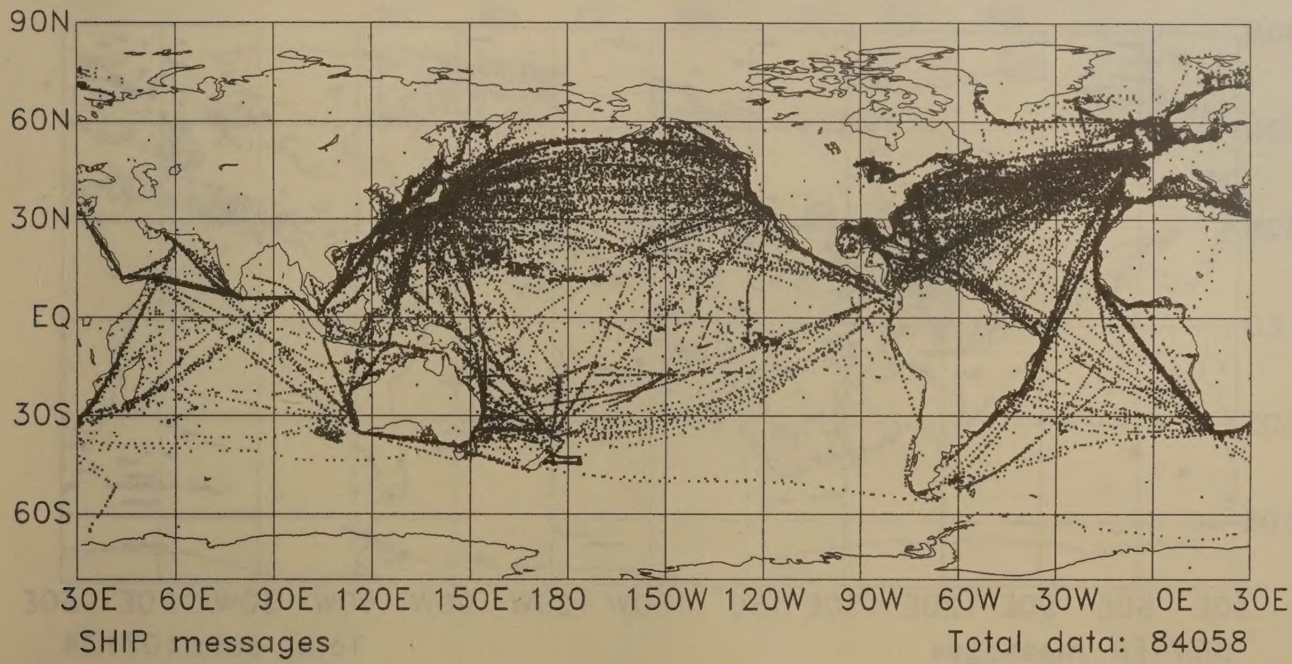
第19図 日本近海表層水温（深さ100M）図（1994年 5月）

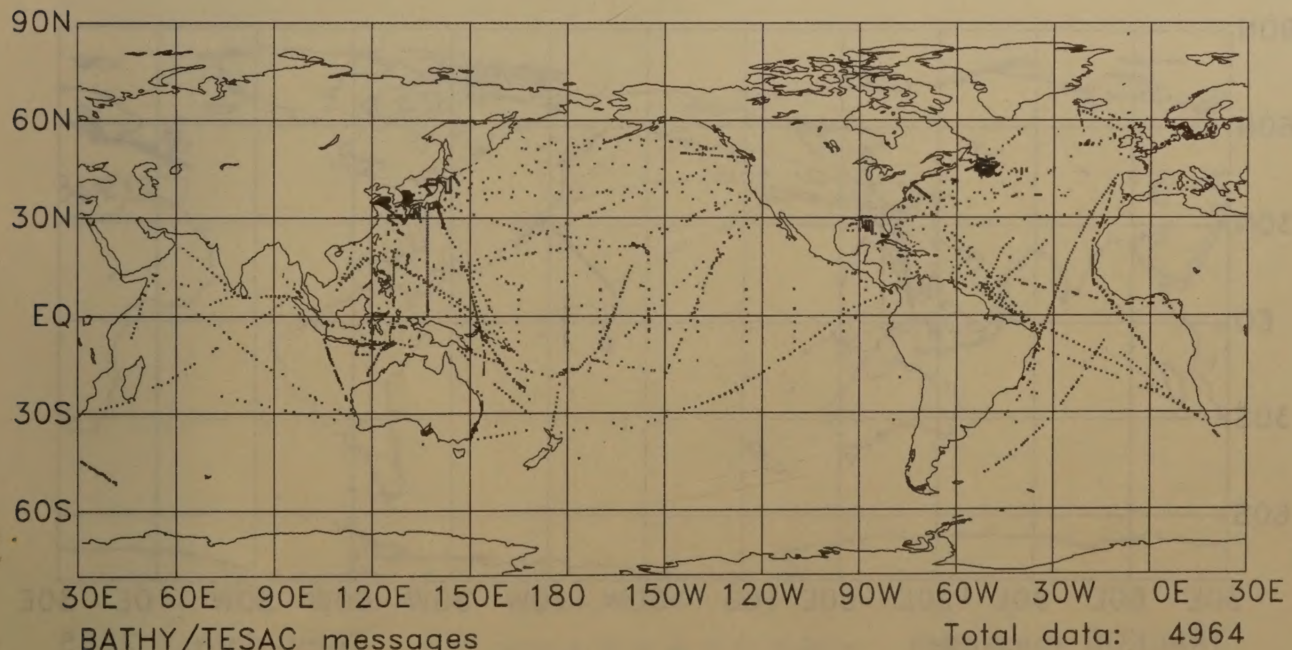
Fig.19 Subsurface (100m) temperatures in seas adjacent to Japan for MAY 1994.



第20図　北西太平洋旬平均海流図（1994年 5月下旬）

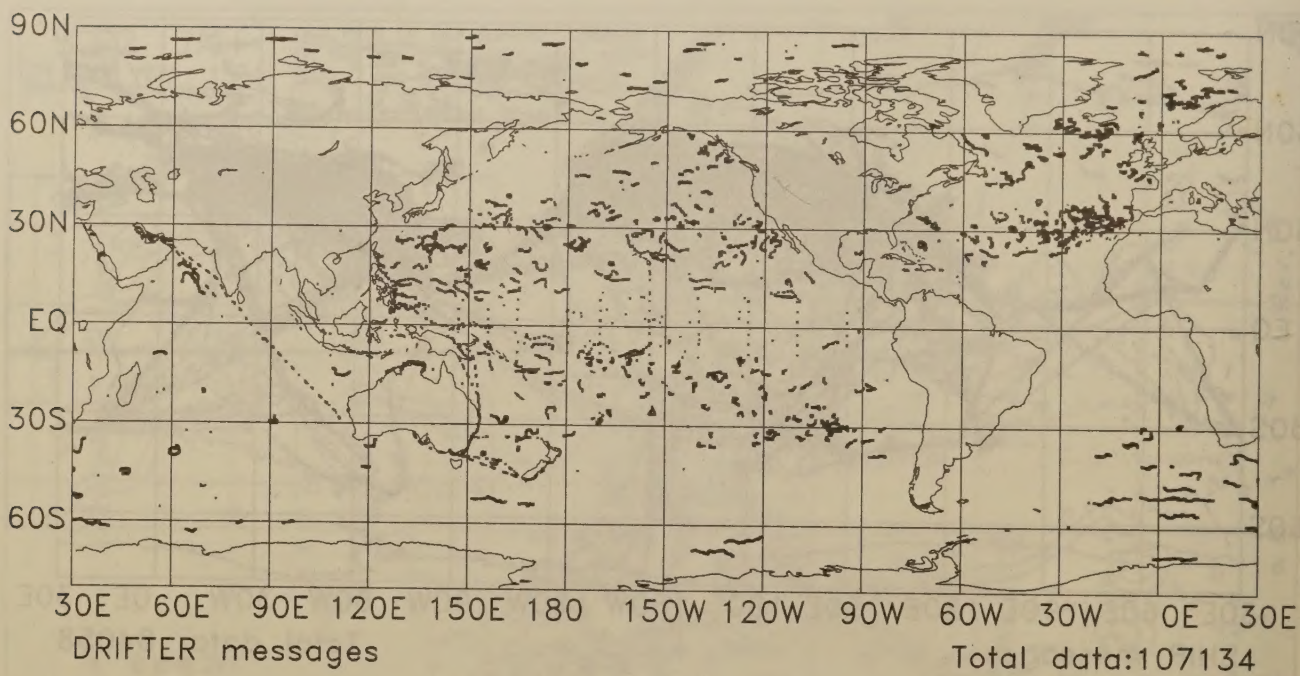
Fig.20 Ten-day analysis of the sea surface current in the western North Pacific for the 3rd ten-day period in MAY 1994. Small arrows indicate sea surface currents measured with acoustic Doppler current profilers, GEKs deployed in research vessels, and ship drift by merchant ships/drifting buoys during the month. Major currents such as the Kuroshio and the North Equatorial Current are denoted by larger open arrows.

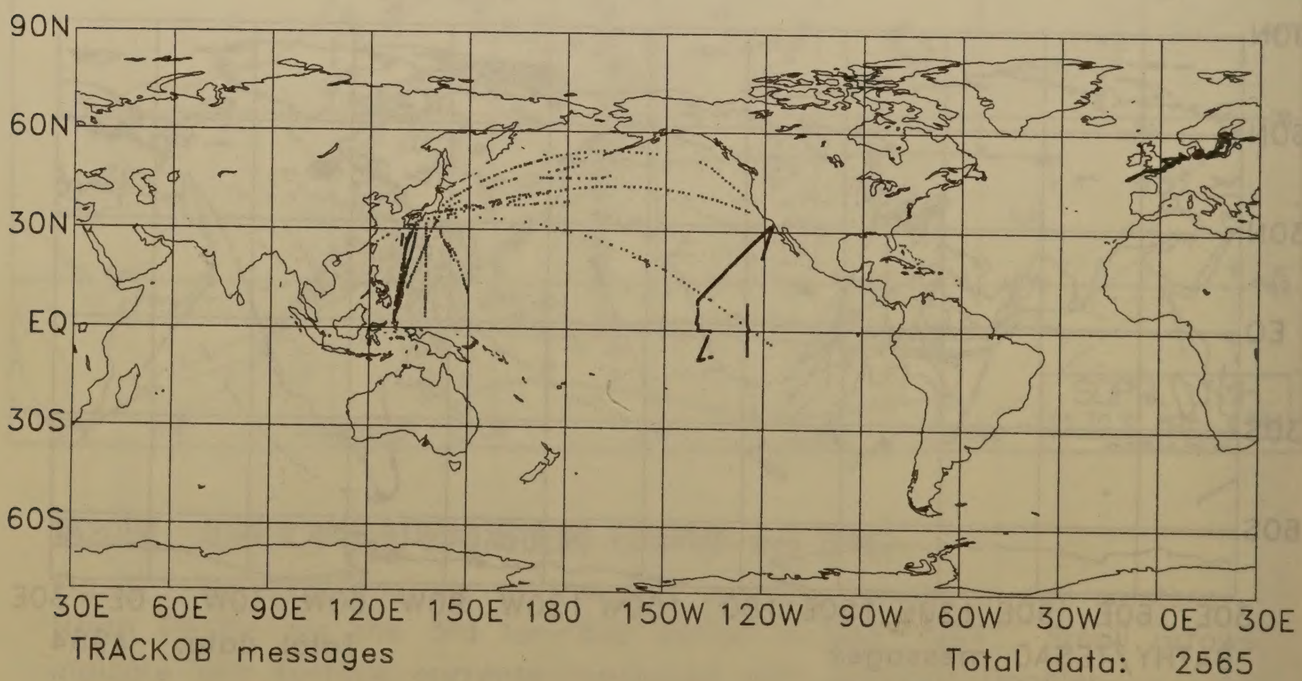




第21-1図　測点分布図(1994年 5月)

Fig.21−1 Geographical distribution of SHIP messages (SST data, top) and BATHY/TESAC messages (subsurface temperature data, bottom) for MAY 1994.





第21-2図　測点分布図(1994年 5月)

Fig.21-2 Geographical distribution of DRIFTER messages (buoy drift and SST data, top) and TRACKOB messages (ship drift and SST data, bottom) for MAY 1994.

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